

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

No. 2533.—VOL. LIV.

LONDON, SATURDAY, MARCH 8, 1884.

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BY POST £1 4s. PER ANNUM.

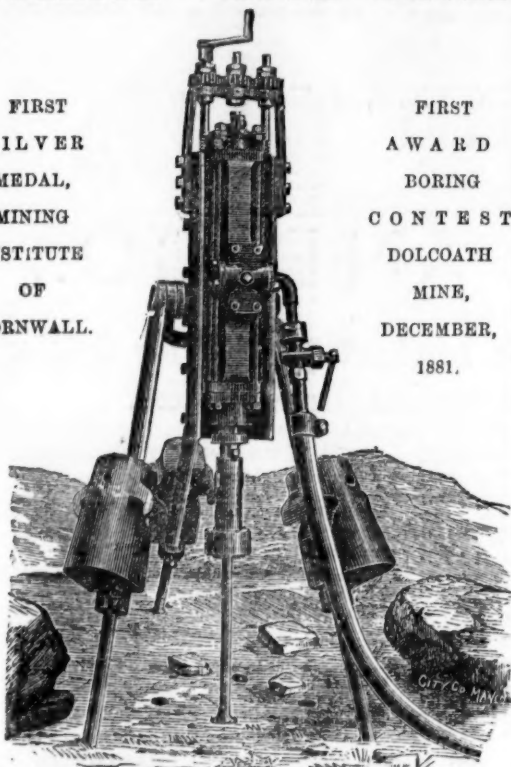
FIRST SILVER MEDAL, ROYAL CORNWALL POLYTECHNIC
—Highest Award for Effectiveness in Boring, and Economy in
the Consumption of Air

JUBILEE EXHIBITION, 1882.

THE PATENT

"CORNISH" ROCK DRILL.

FIRST
SILVER
MEDAL,
MINING
INSTITUTE
OF
CORNWALL.



FIRST
AWARD
BORING
CONTEST
DOLCOATH
MINE,
DECEMBER,
1881.

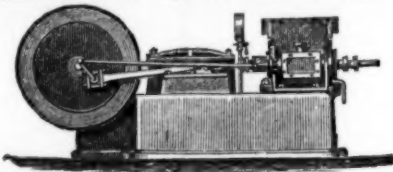
Prices and particulars on application to the Manufacturers
HOLMAN BROTHERS,
CAMBORNE FOUNDRY AND ENGINE WORKS,
CAMBORNE, CORNWALL.

ENGINES, AIR COMPRESSORS, TUNNELLING
CARRIAGES, TRIPODS, &c.,
From own design, or to order.

THE PATENT
"ECLIPSE" ROCK-DRILL
AND
"RELIANCE AIR-COMPRESSOR."

First Silver Medal awarded at Boring Competition, East Pool Mine, Sept. 1883.

PRIZE MEDAL,
HIGHEST AWARD.

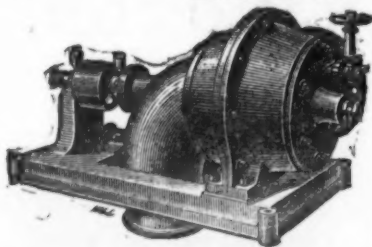


PARIS EXHIBITION,
1878.

ARE NOW SUPPLIED TO THE
ENGLISH, FOREIGN, AND COLONIAL GOVERNMENTS
And are also in use in a number of the
LARGEST MINES, RAILWAYS, QUARRIES, AND HARBOUR
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As arranged, with a horizontal spindle, it is specially adapted for
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ANCHOLME
FOUNDRY,
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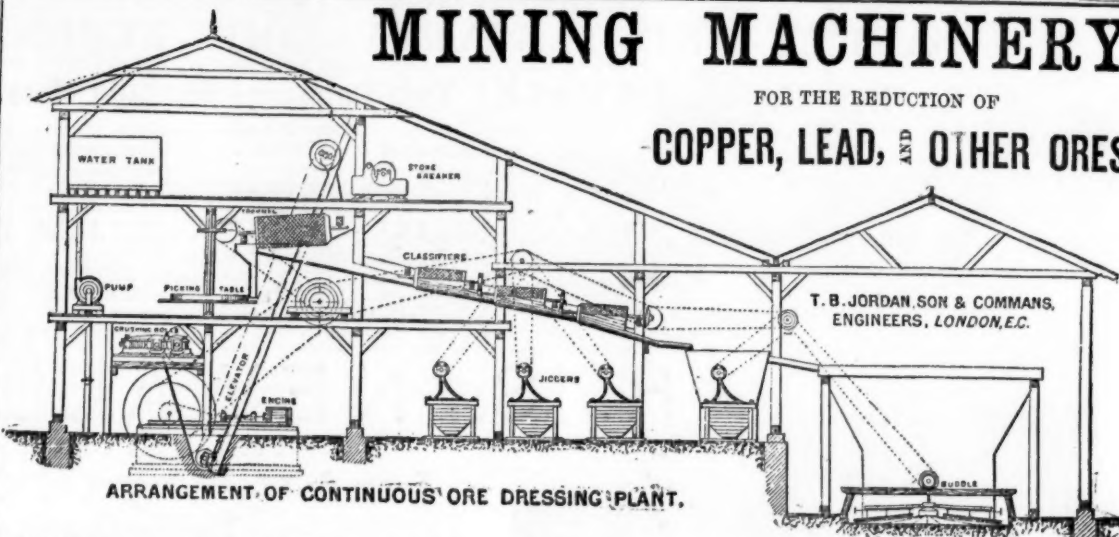
The Patent Trent, New
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Victor Turbines.

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FOR THE REDUCTION OF

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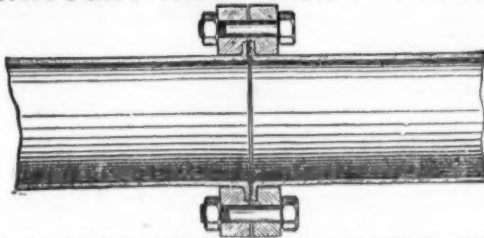
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and CONTINUOUS WORK in the HARDEST KNOWN ROCK in
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SYDNEY. 1879.

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FIRST AWARD.
MELBOURNE, 1881.



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for an Improved Method of Simultaneous Blasting.

FOR SIMULTANEOUS BLASTING.

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SAFETY AND INSTANTANEOUS FUSES AND IGNITERS

FOR USE IN ALL BLASTING OPERATIONS AND SPECIALLY PREPARED FOR ANY CLIMATE

Note the **TRADE MARK**: Two Separate threads through centre of Fuse.

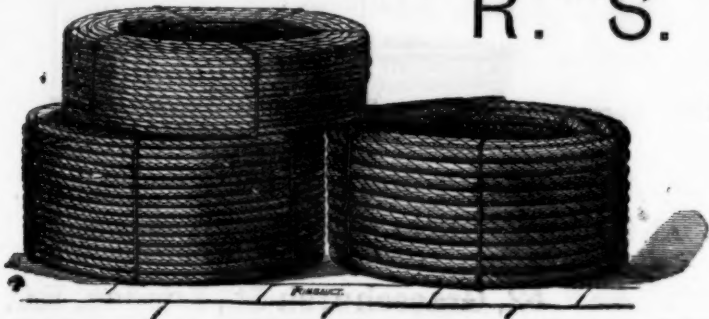
BICKFORD, SMITH AND CO.'S Patent Igniters and Instantaneous Fuses for simultaneous blasting are being extensively used at home and abroad. This improved method is the cheapest, simplest, and most dependable ever introduced for simultaneously firing any number of charges. For full particulars, see Descriptive Catalogue.

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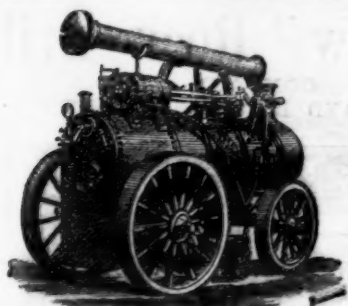
London: 130, STRAND, W.C. Liverpool: 7, NEW QUAY.

Glasgow: 68, ANDERSTON QUAY.

MANUFACTORY: GATESHEAD-ON-TYNE.

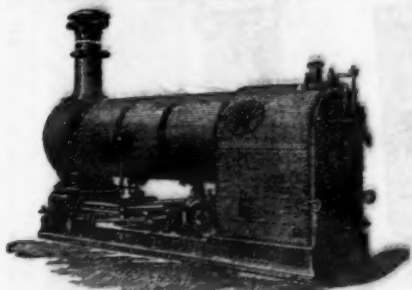
NOTICE TO COLLIERY PROPRIETORS, MINE OWNERS, &c.

The **PATENT "ROBEY" MINING ENGINE** is complete in itself, ready for putting down and setting to work, either as a Permanent or Temporary Winding or Pumping Engine.

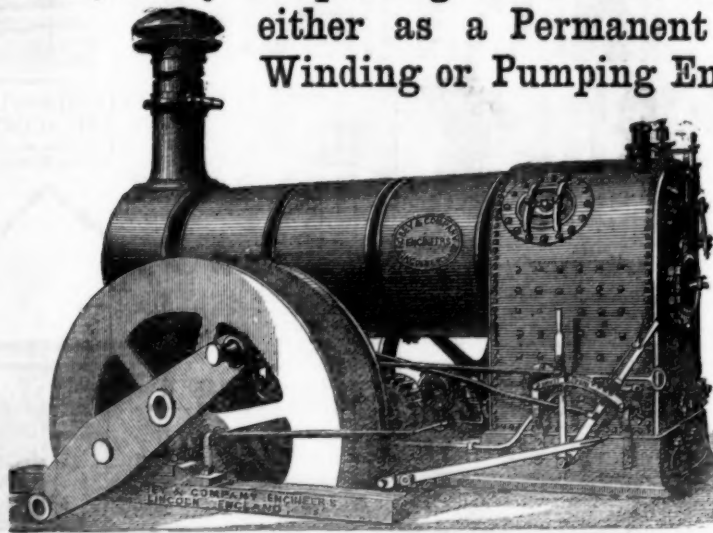


Robey's Superior Portable Engines,
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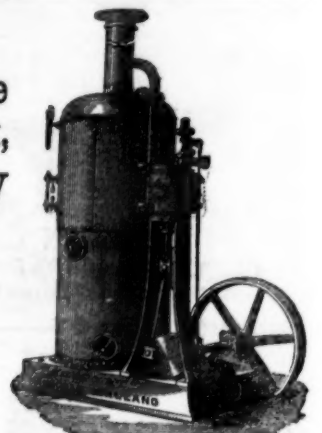
The Improved Robey Fixed Engine and Locomotive Boiler Combined,
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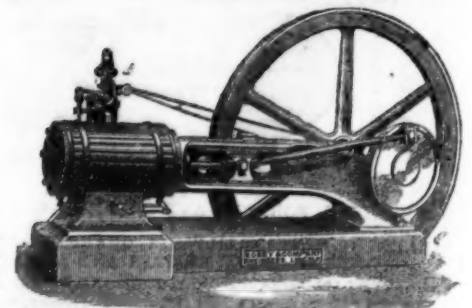
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Robey's Vertical Stationary Steam Engine, 1½ to 16-h.p.



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SEE THE ENGINEERING PAPERS.

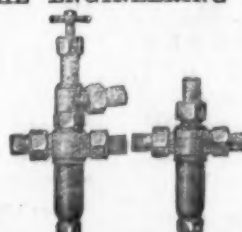
The cheapest and most economical.

Can be cleaned in a few minutes.

All parts made to gauge.

Made entirely of best gun metal.

Is the smallest and neatest.



Has no moving parts.

Will not shake off.

Has the most rapid delivery.

No joints to make.

Prompt and continuous action guaranteed.

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(Late Manager for Sharp, Stewart and Company, Limited, Atlas Works, Manchester. Upwards of 22 years with that firm.)
Price Lists, Particulars References, &c., on Application.

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Patent Steel Trucks, Points and Crossings,

PORTABLE RAILWAY, STEEL BUCKETS, &c., &c.

Telephone No. 14.
In connection with the
Leeds Exchange, and all
the principal Hotels and
places of business in the
town.

GILDERSOME FOUNDRY, NEAR LEEDS.

(Near Gildersome Station, G.N.R. Main Line, Bradford to Wakefield and London,
via Laisterdyke and Ardsley Junctions.)

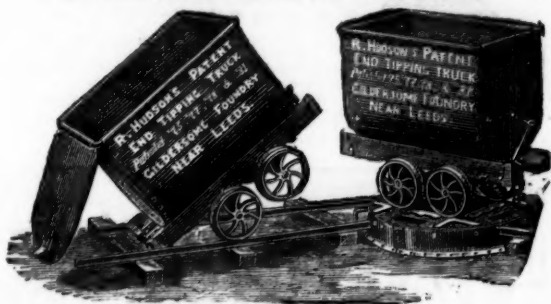
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Telegraphic Address:—
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UPWARDS of 25,000 of these Trucks and Wagons have been supplied to the South African Diamond Mines; American, Spanish, Indian, and Welsh Gold, Silver, Copper, and Lead Mines; Indian and Brazilian Railways, and to Railway Contractors, Chemical Works, Brick Works, and Coal and Mineral Shippers, &c., &c., and can be made to lift off the underwork, to let down into the hold of a vessel, and easily replaced. They are also largely used in the Coal and other Mines in this country, and are the **LIGHTEST, STRONGEST**, and most **CAPACIOUS** made, infinitely stronger and lighter than wooden ones, and are all fitted with R. H.'s Patent "Rim" round top of wagons, requiring no rivets, and giving immense strength and rigidity. End and body plates are also joined on R. H.'s patent method, dispensing with angle-irons or corner plates.

Patented in Europe, America, Australia, India, and British South Africa, 1875, 1877, 1878, 1881, and 1883.
N.B.—The American, Australian, Indian, and Spanish Patents on Sale.

CAN BE MADE TO ANY SIZE, AND TO ANY GAUGE OF RAILS.

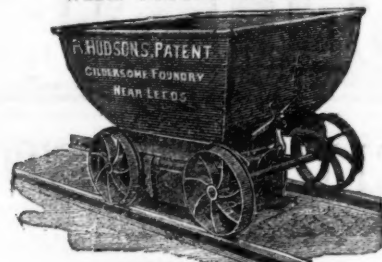
1.—PATENT STEEL END TIP WAGONS.



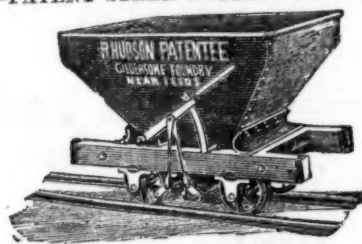
7.—PATENT STEEL MINING WAGONS.



12.—PATENT STEEL HOPPER WAGON, WITH BOTTOM DOORS.

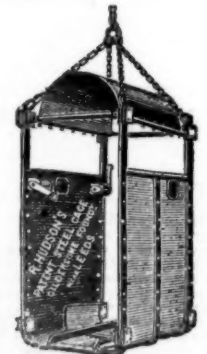


13.—PATENT STEEL HOPPER WAGON.



14.—SELF-RIGHTING STEEL TIP BUCKET.
(The "CATCH" can also be made SELF-ACTING if desired.)

15.—STEEL CAGE.

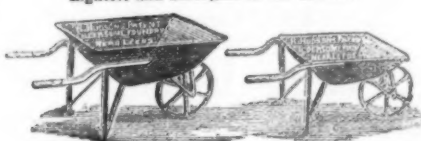


17.—STEEL SELF-CONTAINED TURNTABLE.



(Also made in CAST IRON for use where weight is not a consideration.)

16.—PATENT STEEL WHEELBARROWS.
Made to any Size.
Lightest and Strongest in the Market.

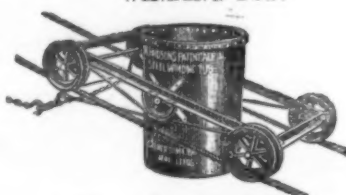


A great success.

No. 19.—PATENT STEEL CHARGING BARROW, DOUBLE the STRENGTH & much LIGHTER than ordinary Barrows.



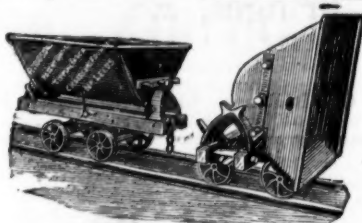
18.—"AERIAL" STEEL WINDING TUB.



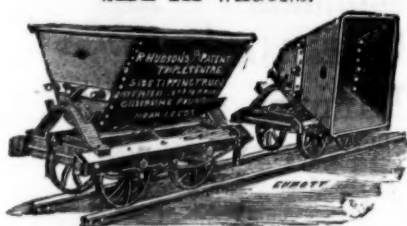
Largely employed in the South African Diamond Fields.

ONE MAN CAN EASILY TIP ANY WEIGHT IN THESE WAGONS.

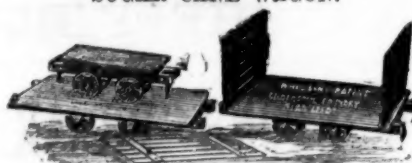
2. PATENT UNIVERSAL TRIPLE-CENTRE STEEL TIPPING TRUCK.
Will tip either SIDE or either END of rails.



3.—PATENT TRIPLE-CENTRE STEEL SIDE TIP WAGONS.



4.—PATENT STEEL PLATFORM OR SUGAR CANE WAGON.



5.—PATENT STEEL CASK.

As supplied to H.M. War Office for the late war in Egypt.
DOUBLE the STRENGTH of ordinary Casks without any INCREASE in weight.
(Made from 10 gals. capacity upwards to any desired size.)



8.—PATENT DOUBLE-CENTRE STEEL SIDE TIP WAGONS.
Will tip either side of Wagons.



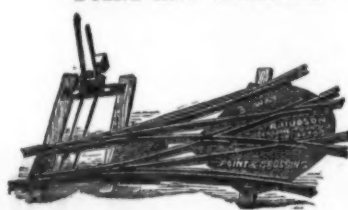
9.—PATENT STEEL ALL-ROUND TIP WAGON.



10.—LEFT-HAND STEEL POINT AND CROSSING.



11.—RIGHT AND LEFT-HAND STEEL POINT AND CROSSING.



6.—ROBERT HUDSON'S PATENT IMPROVED IRON SMITH'S HEARTH, NO BRICKWORK REQUIRED.

A Special quality made almost entirely in STEEL, effecting a GREAT SAVING IN WEIGHT.



Large numbers in use by all the principal Engineers in this country and abroad.

ALL KINDS OF BOLTS NUTS, AND RIVETS MADE TO ORDER ON THE PREMISES

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BELL'S ASBESTOS BOILER PRESERVATIVE. This useful mixture by absorbing the free oxygen that is in the water entirely checks pitting and corrosion. It also disintegrates incrustation so immediately as to prevent its adhering to the plates. Not only is a great economy of fuel effected by keeping boilers clean, but the risk of having the plates burned is thereby obviated. It has been computed that ½ in. thick of incrustation causes a waste of 15 per cent. of coal; ¼ in., 50 per cent.; ⅛ in., 150 per cent. Thus the Preservative avoids the great risks which are inseparable from scaled plates, lengthens the life of a boiler, and covers its own cost a hundred-fold by economy of fuel. It is entirely harmless, and has no injurious action on metals. It can be put into the feed tank or boiler, as may be most convenient. Sold in drums and casks bearing the Trade Mark, without which none is genuine.

BELL'S ASBESTOS YARN and SOAPSTONE PACKING

for Locomotives, and all Stationary Engines running at very high speed with intense friction.

The following Testimonial refers to this Packing:—
Festiniog Railway, Locomotive Superintendent's Office,
Portmadoc, January 13, 1883.

Mr. John Bell, 118, Southwark-street, S.E.
DEAR SIR,
I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed, better than we expected. We have a locomotive packed with it, which has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting Packing. The Asbestos Yarn we find is very useful, and answers admirably.
Yours truly,
(Signed) W. WILLIAMS.

BELL'S ASBESTOS BOILER AND PIPE COVERING COMPOSITION, for coating every class of steam pipes and boilers, non-combustible and easily applied when steam is up; adheres to metals and preserves them from rust; prevents the unequal expansion and contraction of boilers exposed to weather; covers 50 per cent. more surface than any other coating, and is absolutely indestructible. It can be stripped off after many years' use, mixed up with 20 per cent. of fresh, and applied again. The composition is supplied dry, and is only to be mixed with water to the consistency required for use.

A Horizontal Boiler, 17 ft. 6 in. long, 15-H.P., gave the following results:—

Temperature on Plates - - - 186 deg.
" " Covering - - - 94 deg.

One ton of coal was saved per week, and although the fire was raked out every evening, 20 lbs. of steam were found in the boiler next morning.

The following Testimonial refers to this Covering:—

Offices of the Wimbledon Local Board, Wimbledon,
Nov. 28th, 1883.

DEAR SIR,—It may interest you to know that we save exactly 40 per cent. in fuel through using your covering.—Yours truly,
W. SANTO CRIMP, C.E., F.G.S.

BELL'S ASBESTOS and INDIA-RUBBER WOVEN TAPE and SHEETING, for making every class of Steam and Water Joints. It can be bent by hand to the form required without puckering, and is especially useful in making joints of manhole and mudhole doors; also for large "still" joints where boiling fat and steam have to be resisted. It is kept in stock in rolls of 100 ft., from ½ in. (Fig. 6) to 3 in. wide, and any thickness from ¼ in. upwards. Manhole covers can be lifted many times before the renewal of the jointing material is necessary. The same material is made up into sheets about 40 in. square, and each sheet bears the Trade Mark, without which none is genuine. It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with these inferior articles at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears the Trade Mark.

BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOARD, for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toughness and purity, and is absolutely free from the injurious ingredients frequently used to attain an appearance of finish, regardless of the real utility of the material. Made in sheets measuring about 40 in. square, from 1/64th in. to 1 in., and ¼ millimetre to 25 millimetres thick. Each sheet bears the Trade Mark.

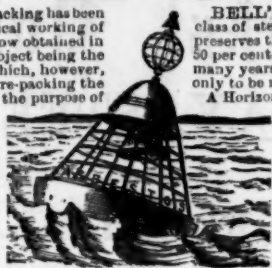
BELL'S ASBESTOS EXPANSION SHEETING (PATENT).

This Sheeting is another combination of Asbestos with India-rubber, giving to the steam user the special advantages of both materials.

The India-rubber Washer is protected from the action of heat and grease by an outer coating of vulcanised Asbestos Cloth, thus producing an excellent joint where expansion and contraction render other materials unserviceable.

This material is admirably suited to steam pipe joints and every class of valve.

Valves made of this material are very durable, as they are not subject to injury by oil.



The goods of this house are of the highest quality only, and no attempt is made to compete with other manufacturers by the supply of inferior materials at low prices. All orders must be sent direct to the under-mentioned depots and not through Agents or Factors.

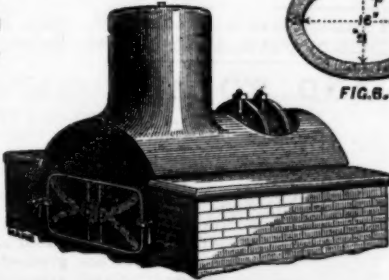


FIG. 5.



FIG. 6.



FIG. 1.

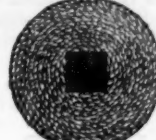


FIG. 2.

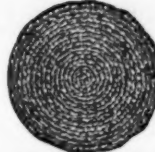


FIG. 4.

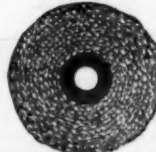


FIG. 3.

BELL'S "ASBESTOS LUBRICANT."

ILLUSTRATED PRICED CATALOGUE FREE ON APPLICATION TO

BELL'S ASBESTOS WORKS, SOUTHWARK, LONDON, S. E.

OR THE DEPOTS—

Victoria Buildings, Deansgate, MANCHESTER.

11 and 13, St. Vincent Place, GLASGOW.

39, Mount Stuart Square, CARDIFF.

21, Ritter Strasse, BERLIN.

PERFORATED SHEET METALS

FOR
TIN, LEAD, AND COPPER MINES,

MILLERS, BREWERS, AND

MALSTERS,

COLLIERIES AND

QUARRIES,

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To Mr. Baxter, Leeds.

Cunderford, Feb. 13, 1893.

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Original Correspondence.

PROFITABLE GOLD MINING IN AMERICA.

SIR,—From a statement of results in the shape of dividends, published by the Mining Record, New York, where it is shown that during the past year no less than \$10,000,000, or 2,000,000 sterling, were paid, should of itself be sufficiently satisfactory to prove that gold and silver mining is an industry deserving the most serious attention of capitalists, business men, and others, who have acquired the habit of looking upon such ventures as illegitimate business.

25 companies, gold, silver, and copper, paid in all	\$67,223,837
20 other companies, up to and including 1883	8,252,811
12 companies commenced dividends this year	1,380,250

57 companies, total dividends to December, 1883	\$77,556,898
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Such substantial results from legitimate mining should of itself speak volumes for an industry which many people, for some unknown reason, look upon with aversion, as if it were derogatory to be associated with legitimate mining enterprise.

Mining of itself, or the production of gold and silver, is not only one of the most profitable but one of the most honourable and legitimate industries to which anyone may devote attention. As an instance of the benefits conferred by the payments of the dividends from the few mines above mentioned, it may be taken as a fair estimate that the profits paid were not more than one-third, or probably only one-fourth of the actual production of new wealth from the 57 companies, or the total production may be assumed at not less than \$250,000,000. This new purchasing power, in the shape of hard money, has diffused itself over a wide area, and helped to initiate and foster a variety of industries which, but for its production, would not have been developed or required. New cities, towns, and settlements have sprung into existence, requiring railway and other accommodation, bringing increased population and all the attendant accessories to the progress of material wealth, luxuries, comforts, and necessities of progressive communities.

The American mines are maintaining a steady and increasing production of the precious metals, while from the vast area of country lately prospected, and now in course of development, there will be soon a very marked increase in the output of gold and silver, and many of those who have made judicious investments in well-managed companies will get handsomely paid for their outlay.

That there is a great future in the history of American mining there can be no doubt in the minds of those who have given the subject any study, or have had the opportunity of personally inspecting a considerable portion of the mineralised country. The mines that are now producing about \$100,000,000 annually, or 20,000,000 sterling, the most of which is added to the currency of the world, will not only maintain that yield, but in all probability it will be materially increased by the rapid development of new mines and new districts, and the reorganisation of companies for reworking on a more extensive scale mines that have for some time been standing idle for the want of energy, and the concentration of capital and labour to carry out works that individual means were unable to accomplish.

The dividends from some of the mines during the past year have been immense, a number of them varying from a quarter of a million to two million dollars. A perusal of the list as published is more pleasant reading than the accounts of meetings of the miserably mismanaged so-called mining companies, which are so often before the notice of the public in your Journal, especially such as appeared last week in reference to the West African Gold Coast mines. During the past three years some curious reports from directors and managers have appeared at different times, but those of last week culminate to a point as to the amount of absurdity, incapacity, and utter ignorance that could be displayed in mining management, or concentrated in a column of twaddle under the name of a report.

It seems almost incredible to think that any body of shareholders could have patiently sat to listen to the miserable tale of imbecility and twaddling experiences of the amateur mining managers and others who have been fooling away the unfortunate shareholders' money, and now have the assurance to ask them to entrust them with more.

Of course there is nothing to prevent enthusiastic admirers of distinguished incapacity placing their confidence and their money in the hands of men who never saw a gold mine or have the slightest acquaintance with practical gold mining; but it would be better for the mining interest generally if they kept the information of the miserable failures they entail more to themselves, instead of parading before the world their own want of judgment in selecting such incompetent men to undertake duties which can only be carried out with any degree of credit by reliable and practical men. The miserable fiasco of the attempt to hydraulic the West African gold mines is only what was to be expected from such impotent efforts which brings ridicule upon the management and unnecessary loss to the shareholders; but it is such ridiculous efforts at mining management that brings discredit on the mining industry generally.

Fortunately for mining such men could only find employment in India or Africa, or through the influence of private friends or sympathetic admirers. It is high time that shareholders of some of these mines that have been so miserably mismanaged caused a strict investigation into the details of expenditure. The publication of the balance-sheets would, no doubt, give some interesting facts not generally known as to how, where, and what for some of the shareholders' money has gone, and what prospect there is of its ever being regained.

America and Australia does not give much opportunity for a public display of the incapacity of amateur mining managers; in those countries they would have to gain their experience by practical work and at their own cost, instead of other peoples.

THOMAS CORNISH, M.E.

IRON MINING IN NEW SOUTH WALES.

SIR,—150,000 tons steel rails! The Government here have called for tenders for above—delivery to commence within 18 months, and extend over 10 years—a colonial manufactured article to have the preference, even though 5 or 6 per cent. dearer than the imported one, and I have very little doubt that even a bonus could be got also of at least 5s. per ton for the first 1000 tons made here, or possibly (preferably for the larger quantity) a 2s. or 3s. bonus for the first 10,000 tons, as although we are staunchly Free Trade, there is a strong desire to foster native industry up to a reasonable extent.

Within 80 miles of Sydney, at a 3000 ft. elevation, there are large deposits of hematite and clayband iron ore, with first-class five-ft. seam clean coal for smelting, underlying at about 300 ft. depth, plenty of water and timber, and the railway running right through the deposits for miles—in fact, we have everything necessary for producing these rails ourselves, excepting the special knowledge, energy, and spare capital to do it with, nor I do not believe there is a man in the colony who really knows (practically) whether it should cost 50,000s. or 150,000s. to erect the proper works!

Should this large contract be sufficient inducement to any English ironmaster to enquire further into the matter (especially with the view of manufacturing out here), I shall be very happy to get him all the information in my power, and also to get our Government Department to do the like.

On one small property alone of about 1000 acres, belonging to Mr. E. M. Munford, of Earls Court, Mount Edgcombe, N.S.W., a lode of hematite is opened for about 40 ft. deep, over 5 ft. thick, and assaying 52 per cent. of metallic iron (and, of course, a *la New South Wales*, there it lies idle), and there are various seams on the surface, seemingly good, extending for miles and miles beyond here in various directions, and rich limestone also within 15 miles easy railway haulage. Also on the southern line there are good deposits of iron ore, but the coal is not quite so good for smelting as in the western line. I hear also that the iron and deposits of Taranaki, N.Z., are well adapted for steel rails manufacture, and as low freights rule between both ports (i.e., that and Sydney) it might pay to either take the coal to the iron, or bring the iron to the coal.

We call a few particulars of interest from the Statistical Register

for the year 1882. The estimated quantity of gold produced in New South Wales during the year was 129,233 ozs., valued at 491,594s. This makes the total yield of the colony from the year 1851 to 1882 equal to 9,310,501 ozs., valued at 34,518,708s. The amount of gold coined at the Sydney Mint in 1882 was 491,240s.; the total amount coined since the establishment of the Mint in 1855 equalled 25,207,179s. There were 39 coal mines in operation during 1882. The total output was 2,109,282 tons, valued at 948,965s. The total number of hands employed was 4647. The northern coal fields produced 1,569,517 tons, the average price per ton being about 9s. 1½d. The quantity raised from the southern and western fields was 539,765 tons, of the value of 233,028s., which made an average of 8s. 7½d. per ton; 48,065 tons of shale were raised during the year, valued at 84,114s., the average price per ton being about 35s. This industry gave employment to 317 miners; 4536 tons of copper ore were raised and smelted in 1882, valued at 250,175s. The value of smelted copper from Cobar alone was given as 207,050s., and from Rockley as 32,500s. The amount of tin produced was 7595 tons, valued at 416,495s. Most of this tin came from Tingha and Emmaville; 7476 tons of iron, valued at 37,224s., were produced at Lithgow during 1882.

With regard to the progress making at Sydney it will be interesting to the readers of the *Mining Journal* to learn that the docks and slips which the port possesses are not quite all that are necessary to meet the requirements of a shipping trade such as that which Sydney enjoys, but they offer very great facilities for the examination and repair of vessels, and very shortly there will be constructed a first-class graving dock, which will be capable of supplying the wants of the largest class of vessels, including ironclads. The Government Docking establishment at the present time is situated at Cockatoo Island, about 3½ miles up the Parramatta River, and is known as the Fitzroy Dock. It is capable of taking in a ship 475 ft. in length, which is considerably in excess of the length of the steamship Orient, and it is constantly occupied by war vessels large mail steamers, such as those of the Pacific Mail Steamship Company, and the tugs and dredges belonging to the Government. The actual dimensions of the dock are—Length 485 ft., breadth 86 ft., and depth to coping of invert 26 ft., and its total cost has been 95,550s. Mort's Dock and Engineering Company possess a graving dock at Balmain, which is capable of receiving almost the largest class of vessels trading here. Its length is 410 ft., its width 60 ft., and there is a depth of 20 ft. of water at the entrance at spring tide. The most approved appliances for cleaning and painting iron vessels and stripping and re-coppering wooden ships are employed. Connected with the dock there is a patent slip, with a cradle 205 ft. in length, which can accommodate vessels up to 1000 tons burthen, and the engineering and other works contain all the latest improvements in labour-saving machinery.

Rountree's Floating Dock in Waterview Bay is 164 ft. long and 42 ft. wide, with 12 ft. of water for vessels using the dock. It is capable of docking vessels of 600 tons. The A. S. N. Company's patent slip can take up vessels of 1500 tons burthen, and offers every facility for cleaning, painting, lengthening, or repairing vessels. Davy and Sands' Albion Slip and Engine Works, adjoining the Colonial Sugar Company's Works at Pyrmont, can accommodate vessels of 500 or 600 tons. The cradle is 180 ft. in length, and the length of the way is about 400 ft. The slip has only recently been constructed, and no expense has been spared to make it sufficient in every way for the purposes intended. In connection with it are engineering works, at which ship and engine work of different kinds is effectively carried out.

The proposed new graving dock, for which a sum of 150,000s. has been voted by Parliament, is to be constructed at the south-east corner of Cockatoo Island, and will be excavated entirely in the sandstone rock. The length of the dock from the inner stop, to its head will be 600 ft., but by placing the caisson against the outer stop a total length of 630 ft. will be available. The width will be 108 ft. between copings, diminishing by a series of altars to an average width of 34 ft. at the level of the floor; and the dock will be divided longitudinally into four bays by three vertical piers on either side, with ample facilities for shoring vessels and providing easy access for the workmen employed. The width of the entrance will be 84 ft., and the depth of water over the sill at neap tides will be 28 ft., and at spring tides 30 ft. 6 in. The dock will be the largest single graving dock yet constructed; it will be capable of receiving the largest vessel afloat, and will be available both night and day.

Sydney, Jan. 30.

R. D. A.

DIAMOND MINING IN NEW SOUTH WALES.

SIR,—Well knowing that you will be glad to record a new source of wealth for Australia, I subjoin a few extracts from an interesting account of the diamond mining industry of New South Wales recently given by a Victorian miner in the *Argus*, and trust they will be acceptable to the readers of the *Mining Journal*. I may explain that the syndicate referred to is the Australian Diamond Mining Company (Limited). The writer observes that the township of Lower Bingera, which is the centre of the diamond drift country of New South Wales, is situated on the left bank of the Gywydr or Bundara River, and distant from Sydney 352 miles. The river from its source downwards to the point where this township is situated forces its way through a succession of precipitous gorges, alternating with narrow valleys—and it is at the point where the gorge breaks away and the river escapes into an extensive plain that the township is built—the ranges receding backwards, and thus widening out the valley through which the stream flows downwards towards the great arid wilderness which stretches away to the westward.

Some 12 or 13 years ago the quiet village of Bingera was the scene of much enthusiasm, which had been aroused by the discovery of diamonds in its neighbourhood. The mining speculators of Melbourne and Sydney entered into the excitement with all their wanted boldness and energy. Leases for diamond mining were taken up on the field in every direction, and the floating business went on furiously; but, fortunately, for only a brief period of time. An individual whose name I have now forgotten brought down to Sydney what he declared to be a diamond, and some of those who had the privilege of seeing it declared that it possessed a brilliancy surpassing anything which had hitherto been found out of Fairyland, and compared with the Kohinoor, its superiority as regards size was the difference between the egg of a pigeon and that of an emu. The pressure of public feeling, however, compelled the owner or owners of this mysterious gem to submit it to the judgment of the late Rev. Dr. Clarke, eminent geologist, for his decision as to its quality. The opinion given by this expert fell like a bomb into the camp of the speculators, for he pronounced it as nothing but an exceedingly beautiful piece of crystallised quartz. And thus evaporated in thin air the Bingera diamond bubble of some 12 or 14 years ago. But a reaction in this matter has just begun to set in.

A syndicate of Melbourne capitalists have entered the field, and having secured the services of a practical expert, who has had both Brazilian and African experience to recommend him, they have put into his hands for management the large diamond mine which they have secured. From the spirited and energetic way in which they are carrying on operations, it is evidently their intention to solve the question whether the diamond industry in this locality can be made a profitable one or otherwise. The mine which this company has secured is situated at a distance of about six miles from the Bingera township. On visiting the workings two weeks ago I found that the mining resorted to at present is of the simplest character. The process resorted to is open cutting. A large piece of ground has already been opened by excavation. It commences at the side of a small mound, and runs right into a depth of 14 ft. With the exception of about 4 ft. of top gravel, which is carted away, the whole of the intervening matrix to the bedrock is put through the puddlers. The chief difficulty which the company has at present to contend against is the distance of the mine from water. The river is three miles from the mine, and this involves, I understand, about 6s. per load for cartage. To economise this expense a rock-borer will shortly be erected to prospect for water on the claim.

For the benefit of the Victorian miner, the writer describes the indications which betoken the existence of the drift in which the diamonds are found. In this district this valuable gem is found in a

series of gentle undulations or small made hills, as the miner generally terms them. These hills in this district lie at the base of a basaltic range, which forms the southern boundary to an extensive plain through which the river flows. The evidence that they possess the diamondiferous wash is the presence all over the outside of them of large quantities of small round pebbles as smooth to the touch as if they were polished, and of every variety of colour. There are two kinds which are particularly conspicuous—a black one, and another of red colour, but beautifully mottled all over with quartz. The wash in which the diamonds are found seems to be a broken up soft rock, and something similar to our Victorian pipe-clay in appearance, though differing from it, I doubt not in its constituents. This rock evidently belongs to some sedimentary formation which has been shattered and carried some distance by the force of water. The geological indications of the rock structure of this district are to the Victorian miner of an extremely bewildering character. We have basaltic hills rising up a height of some 700 ft. or 800 ft. above the level of the diamondiferous formation which lies at the foot of them.

Notwithstanding all the evidence which I have above pointed out as showing the existence of diamond drift in this locality, I can, in opposition to these very facts, show in other localities the existence of diamonds without any of those various classes of rocks which I have specified as being present. On some of the tributaries at the upper part of this river, at a distance of 40 miles from here, small diamonds are constantly being found by the miners who are working for stream tin. This is in a purely granite country, where no other rock except basalt is within many miles of it. That this granitic formation had at one time been covered with basalt is evident from the traces which it has left behind, its subsequent denudation being owing to pluvial action through long-drawn ages. Here, then, we have two classes of circumstances in juxtaposition to each other. But has it not been exactly similar if we give a true interpretation to the history of our gold mining experience? It was almost an admitted theory that gold would never be found at any depth in reefs. A commission was appointed for eight years after the Victorian Mines were opened to examine this very question, and there was almost a consensus of opinion among the miners examined that gold in reefs generally ran out at about 1000 ft. Does anyone accept this conclusion now? Then the point of contact of the Silurian with the igneous rock was another grand theory which was generally accepted. Now, it is an admitted fact that it has been on the great fields of Sandhurst and Ballarat, where the rocks are least altered, that the greatest amount of gold has been found. In the early mining days, even the geologists spurned the idea of gold being found in granite. Who questions its existence in this rock now? I deduce from these facts that if diamond mining could be established as a payable industry on any of the fields in Australia this gem would be found under conditions which to us at present would seem highly improbable.

The conclusion which I have arrived at, judging from the evidence before me, as regards the probability of the diamond industry in this district becoming remunerative, is one of a favourable character. All previous prospecting for precious stones on this field has disclosed this fact—that there is a certain percentage of diamond-sized diamond gems in every load of matrix. This being given, then, provided an abundant supply of water can be found on or in the claim, can sufficient small gems be found to cover expenses? Men whom I have spoken to, and who presume upon an African experience, speak affirmatively on this matter. Such also being given, the next position for consideration is this—Is there any probability of finding larger gems which might pay dividends. Again, those of experience say yes. Even in Southern Africa, it must be noted, the amount of matrix which is washed to procure payable gems in some of the large claims there is something enormous.

Let me impress upon those who may feel inclined to enter into this speculation that it is one, so far as I can judge, which is altogether dependent for its success upon an abundant supply of water. To secure this may involve boring and sinking through hard rock, but in this there may be a prospect of some advantage, for a second bottom may be found. Whatever process may be necessary to secure the end aimed at will involve an outlay demanding such heavy calls that only strong and well organised companies can afford them. These difficulties alone should necessitate that the affairs of diamond mining in this quarter should be entered into untrammelled with the burden of heavy preliminary imposts levied by those harpies of the district who monopolise the ground without performing any labour covenants, and block up the path of progress by their ruinous exactions upon capitalists.

The article from which these extracts are made is about as long again, but the portions of it here given will convey a fair idea of its contents and character. I shall take the opportunity of giving you further information on the subject hereafter.

Melbourne, Jan. 16.

N. BARNET.

WEST AFRICAN GOLD MINING—HOW TO MAKE IT PAY.

SIR,—It seems somewhat probable that gold mining on the Gold Coast of Africa will follow in the steps of the Indian gold mines, and become as great a failure; and yet the two countries stand on a different footing altogether. There is gold in the former—of that there can be no doubt; for, setting aside what travellers have told us, facts prove it. Gold has been sent home; and, for aught I know, is still being sent home from more than one mine. For instance, the returns of gold from the Gold Coast Mine have realised over 2000s. during the last year, to say nothing of what has been sold there to meet expenses. The Wassau Mine also has, I believe, sent home something handsome. The same cannot be said, I think, of India. Well, now, if there be gold, how is it that, up to the present time, the mines have been unsuccessful, and that a failure is probable? The answer, I think, is, that the good old saying, "Union is strength," has been entirely ignored by the promoters and others interested in them. By far too many mines have been started, and most, alas, with a subscribed capital so small as to ensure failure. Hence the bad name the country has obtained for gold mining.

Now, Sir, I think, and it is not too late even now, if one good promising mine had been started and well supported—if a good consulting firm of engineers had been engaged—that we should have seen a different state of things altogether; it would have been there as at home—one good paying mine would have done good to a whole district, while two such would have drawn plenty of capital to the whole of the Gold Coast Colony. I say it is not now too late to turn a failure into a success. Let all interested—vendors, directors, shareholders—support the best of the existing companies, and by all accounts the Gold Coast Company is such, and acknowledged to be such, although at present, from some cause or other, somewhat in difficulties. Let them, as I suggested before, take and act upon the advice of a good consulting engineer, choose directors who are men of business and probity, and then success will no doubt follow; the district will obtain a good character, and those men who now have so many concessions ready to float will be able to do so, provided, that is, they are moderate in their terms, and do not ignore the interests of the shareholders.—Feb. 29.

J. BUDD.

GOLD COAST MINING COMPANY.

SIR,—It would be hard to imagine a much more absurd fiasco than that arrived at in the special general meeting of this company briefly referred to in last week's *Mining Journal*. A committee had been appointed by the shareholders to enquire into certain alleged abuses in the direction. They find them to exist and to be so serious that they recommend the shareholders to accept the resignations that had been tendered by all the directors. They also find that the Chairman, Capt. Molesworth, has been mainly responsible for these abuses. Being asked to suggest a new board, they name five gentlemen, one of them being that member of the old board who had chiefly supported the Chairman. He and two others decline to serve unless Capt. Molesworth is re-elected. Capt. Molesworth's name is put to the meeting, strongly opposed by the committee, carried on a show of hands by a majority of one (three persons having voted in his favour who are not shareholders). A poll is demanded; this would have given an overwhelming majority against him, the committee alone holding

upwards of 4400 proxies, being probably more than half the voting power of the company. But the committee's board would thus have dwindled to two members. It did not occur to them to ask the secretary what other names he had received the required seven days, notice of. They suddenly withdrew their opposition. On the new board, therefore, Capt. Molesworth has a party of at least four, with only one declared opponent.—*Poultry, March 4.* A. JOY.

THE GOLD PLACERS OF NEW MEXICO.

SIR,—Two great drawbacks to the full development of these important fields of mining industry in this territory have existed in the past, and to a less extent still exist—the land grant question and the lack of water. The latter is gradually being overcome by improved engineering appliances, sinking artesian and other wells; but till Government definitely decides as to the status of the numerous grants which disfigure the surface of this fair territory, the present known gold fields will not be worked successfully, and numerous portions of the territory believed to be rich in placer gold will remain unprospected. The present best known gold placers are those of Elizabeth Town, in Colfax County. They lie on the eastern slope of the main range, and have doubtless been formed by the debris from the various gold-bearing veins that are known to exist there, and which have for centuries been washed down by the annual floods of the rainy season, until thousands of acres of rich auriferous gravel have been deposited among the foothills and along the streams in this part of the county.

Some years ago a company was formed, composed chiefly of those who had a real or pretended claim to the grant on which the best known of these placers were found—the Maxwell grant; and hydraulic washing has been very successfully carried out, netting for years in succession large amounts, in one instance over \$60,000. When the question as to whom the mineral deposits on the various grants belong shall be definitely settled, then, and not till then, will the immensely valuable area of placer ground be thoroughly utilised, returning untold wealth to the fortunate possessors. All through the north-western part of the territory, on the head waters of the San Juan, and on the reservation bordering on Utah, there lies a country which (owing to its distance from civilisation, and from having been until recently the home of the wild Indian) is practically a *terra incognita* to the miner, although it has been traversed by a few prospectors more adventurous than their fellows; and the writer of this article has seen specimens in the hands of some of those who, more fortunate than their fellows, got back with their scalps intact, that are marvellous in their richness.

Within the last few weeks quite an excitement has been caused by the discovery of placer gold in the heart of this city. Although for years—as far back as the first Mexican settlement here almost—it has been known that gold existed in the vegas or meadows from which this city takes its name, and in the bed of the Rio Gallinas, which traverses them, but only recently has it been claimed to have been found in paying quantities. The recent discovery was accidental, and in this wise—The foundation for new county buildings was being excavated, when in doing this a stratum of gravel was cut, apparently gold-bearing in its character. Tests were made, fully proving the fact that gold was there, and now the whole vegas for miles have been staked off, and gold washing has become one of the industries of the city, but so far no reliable evidence has been given to show that the mineral has been found in quantities to pay. The dust found is very fine, and prospectors are working up towards the mountains with the usual results of finding it in coarser grains and in larger quantities. Three or four gold-bearing veins have been found, and doubtless others will be discovered as prospectors get down to steady business.

This recent find verifies rather sooner than was expected the opinion given in a former letter that all that was needed was a careful examination to prove the existence of mineral in paying quantities in the vicinity of this city. The best results yet obtained have been at the rate of \$1-25, or 5s. English money to the cubic yard by ground sluicing, and \$2-40, or 10s., by pan washing, but in neither case would these be remunerative, even if the ground averaged that, owing to the mechanical difficulties attending the locations, so that the real value of the find has yet to be proved.

Travelling southward on our great artery of travel—the Atchison, Topeka, and Santa Fé Railroad—we reach the gold placers of Santa Fé County. A large portion of these are on the Ortiz grant, and as this is a confirmed grant, the mineral belongs to the grantees. These are, however, apparently quarrelling among themselves, and the lands are consequently unproductive. A small stream—the Gallisteo—bounds these places on the north. This stream contains water on the surface during, and for a short time after, the rainy season, and after the winter snows have melted; the remainder of the year the waters sink to bed-rock, but can always be found by digging. Sometime ago machinery was placed on this stream, and preparations were made to drain it and force the water up to the more elevated parts of the placers, but squabbles among the claimants to the grant rendered the scheme abortive. The placers extending southward gradually rising till they culminate in the mountain range known as the Tuerta Mountains, in which is situated the village of the Old Placers, or the Placita de Real de San Francisco. A company was organised some years ago, a stamp mill of 20 stamps erected, a valuable gold mine in the mountain opened up, and then the whole thing shut down, one man being left to guard the mill and machinery, and the owners have since that time been apparently enjoying a game of freeze-out among themselves. The ground around the Mexican placita or village just named is literally honeycombed with holes dug by the past and present Mexican residents, who make almost their entire living by pan washing, and it is no unusual sight during the rainy season, when every little gully and runlet coming from the mountain is full of water, to see every man, woman, and child intent on searching in these for the shining particles, and rarely without success. The writer put the gold-bearing qualities of the soil here to the following test, with results so extraordinary that he would hesitate to mention it for fear of his veracity being doubted, if it had not been made in the presence of two gentlemen of high standing, one an ex-Member of Congress, and the other the then Territorial Treasurer. It had been declared to the writer that even the gravel in the travelled road through the village would show "colours," and to test this he took two separate panfuls (about 25 lbs. each) from two different places in the road, one being where a wagon had just passed a few minutes before, and after carefully washing them himself in one case he obtained 26 and in the other 17 colours (or particles) of gold, the aggregate value of which was 20 c., or 10d. English money.

Could an amicable settlement be arrived at among themselves, and united action taken, the owners might soon realise immense fortunes, but as it is their wealth is being frittered away by native and other proprietors.

Outside of this grant there are several thousand acres held by different individuals who are unable to work their claims except in the most primitive way for want of capital to sink the necessary wells from which to obtain water for washing. Within the last few days a test was made of some of these placers, when gravel at the grass roots gave at the rate of \$7-25 to the cubic yard, and as there are scores of acres yet unappropriated a rich return is awaiting someone who has capital enough to work them.

Nine miles further south are the new placers, known locally as the Golden Camp. Here between the south slope of the Tuerta Mountains and the north slope of the Orique Mountains are many thousands of acres of rich placers. These have chiefly been fed from the last-named mountains, in which are found numerous rich gold-bearing quartz, ledges, or veins. As in the case of the old placers, these have been known for a number of years, and worked in a primitive fashion. Recently, however, a company of Eastern capitalists have acquired a right to several hundred acres, have bored for and found water, and are now ground-slucing with good results. Here also may be found large quantities of good ground still unoccupied, and only waiting for capital.

As already mentioned, numerous gold-bearing veins have been opened up in the adjoining mountains, and machinery is being put in to reduce the ores.

The mention of this camp would be imperfect if some reference were not made to the notorious San Pedro and Canyon del Agua mining suit.

On the north slope of the Orique Mountains is the now famous San Pedro Copper Mine, which has been, and is now, the subject of litigation between what is known as the San Pedro and Canon del Agua Company, and certain Mexican parties, each claiming the ownership. It is claimed that the San Pedro grant was originally an "agricultural" grant. But as soon, however, as the San Pedro Mine became famous—the owners of the grant, it is claimed, so altered the lines of the grant as to include this mine—took possession; erected extensive reduction works, and proceeded with all speed to gut the mine. After unavailing efforts to get the matter settled by law the Mexican claimants seized possession at the muzzle of the Winchester, and for a time held it in despite of all legal steps taken to dislodge them. The principals were finally committed to jail for contempt of court. Their legal adviser, who had investigated the forcible seizure with a view to bring matters to a focus, being included in the committal, and it was only after an arrangement was entered into by which neither of the claimants should hold the mine, but that it should be in the hands of the Court—that they were released—the general government, on being appealed to has ordered a new survey of the disputed grant, it having been claimed that previous surveys were fraudulent. The conduct of the Chief Justice and of the Surveyor-General in the matter has been called in question and judicial investigation by Congress is now going on.

The settlement of this most important suit, and that speedily, is earnestly looked for by a large number of interested parties—not only on "local" account, but on the bearing it will have on the whole "grant" question. Untold wealth is looked up by the uncertainty that hangs over this matter, and until it is definitely settled the development of this country will be retarded. It is only recently that in a grant dispute one of our best citizens was shot in cold blood. This murderer, also a prominent citizen, was wounded, and was thought mortally, but who is now recovering, and is under bonds to stand his trial for shooting with intent to murder. Numerous similar instances could be cited, and a final deliverance by the Government is a consummation devoutly wished for. My next letter will take in some of the camps in Socorro County.

JOHN ROBERTSON.
Las Vegas, New Mexico, Feb. 12. Mining and Consulting Engineer.

KAPANGA GOLD MINE COMPANY.

SIR,—Mr. Baker seems to be in great trouble because the directors of this company will not listen to his wise suggestions. If he tried his plans nearer home, and introduced them in Cornwall, he would no doubt be hailed as the saviour of Cornish mines—that is, dismiss every manager of losing mines, and appoint a "cheap man at a small salary, with a suitable increase when they are brought into paying condition." The directors need not ask Capt. Thomas for his resignation. He wished, and offered to resign long ago, but the directors received it with dismay.

Mr. Baker's "shadow" of a question as to "pilferings of gold" is so perfectly "shadowy" and ridiculous that no man of common sense would think of replying to it. Would it not be wise for every cobbler to stick to his last?—*Cork, March 3.* OLD MINER.

GUINEA COAST GOLD COMPANY.

SIR,—Nearly a year ago you allowed me through the medium of your columns to give my reasons for believing that the 43,000l. paid for the alleged "rich reef" had in fact been paid for a thing that had no real existence. The directors, no longer able to conceal this fact, though they have known it for at least 12 months, have at length tacitly admitted that the prospectus of this company was inaccurate, and that they had virtually thrown away 50,000l. of the company's money upon the worthless Izrah property.

I have already shown how these gentlemen allowed themselves to be deceived in a way that was disgraceful to them as men of business, and, therefore, I say no more on that point; but I do ask the shareholders to consider whether any reliance can be placed on men who for nearly a year have studiously concealed our real position as to the original venture, and have for all that time been embarked in another and fresh enterprise without our knowledge or consent? Could anything be more disingenuous and unaccountable than their conduct in this respect? Clearly it was their bounden duty to call the shareholders together, and let them determine what should be done when they knew that it was impossible to carry out the purpose for which, and for which alone, the capital of the company was subscribed.

As to the present prospects no one knows better than the directors that any expectation of profits from mineral which only produces 6 dwts. of gold to the ton in the laboratory is absolutely ludicrous. Let shareholders read what Capt. Cameron said the other day at the West African Gold Fields meeting, and they will see what he thinks upon this point. In conclusion I venture to predict that in two years, certainly within three, this company will be wound-up, with the result that the general body of the shareholders will lose every penny of their money. The directors, of course, will be all right, because their fees will recoup them all that they have staked, to say nothing of the gains of two of them as members of the syndicate that sold the rich reef to this fortunate (?) company.

Brighton, March 4.

FRONTINO AND BOLIVIA GOLD MINE.

SIR,—When I wrote upon the above subject in your Journal of Feb. 8 I was not aware that before Jan. 1, 1883, the Frontino had been net 2240 lbs. but 3024 lbs. This of course largely affects the calculations I then made. Thus the yield of gold for 2240 lbs. in September, 1881, was 19½ dwts., not 26 dwts.; and in August, 1880, 17½ dwts. per 2240 lbs. of ore in place of 24 dwts. I see that for December, 1883, the yield was only 13 dwts. per 2240 lbs. of ore, and the loss upon 2668 tons of ore raised and stamped was 162l. 2s. Now, as in September, 1881, the yield of gold was 19½ dwt. per 2240 lbs. of ore, it will follow that had the yield been the same in December, 1883, in place of a loss of 162l., there would have been a profit of 2337l. on the month, for it costs no more to extract 19½ dwts. than 13 dwts. per ton. It is, therefore, quite evident, as I pointed out in my letter of Feb. 8, that the one chief evil connected with the mines is the great falling off in the richness of the ore.

If, as your correspondent "Enquirer" states, Australian gold can be got out for 3 dwts. per 2240 lbs., equivalent in value to about 4 dwts. of Frontino gold, it would be well for the managers, directors, and shareholders in Frontino to look into these matters without delay. I sent a copy of my letter of Feb. 8 to Mr. R. B. White, and one to Mr. Donagan, before the meeting; but the letter was in no way noticed, though the great fact which it pointed out remains, even allowing for the incorrect weights, I took as the basis of my calculations. If the gold could be got out for 4 dwts. per 2240 lbs., the profits, even with a yield of only 13 dwts. per ton would be very considerable. At present the mines are without capital, and practically without profit, and the shareholders have, I am afraid, bid farewell to dividends.—*March 3.* RECIPROCIITY.

A DISCURSIVE VIEW IN THE INTEREST OF MINING— No. VI.

SIR,—Mines in limestones are usually more demonstrative superficially than are those in the granites, whilst regularity, continuity, and permanency are pre-eminently characteristics of the latter. It is because of this sobriety, so to speak, that the merits of the latter class are not recognised by inexperienced observers, and if merit attaches to them at all in their estimation it is unappreciated at its true significance and value. Hence the chances are increased, especially in a country like this, in favour of shrewdly observant practically experienced miners, and those who patronise solidity of worth in preference to more showy but less reliable attractions are most likely to realise the larger and more largely gratifying results from the consciousness of their being derived legitimately from one or more of the fundamental sources of such wealth. It is the latter

class of mines that I have been endeavouring for some time past, through the medium of the *Mining Journal*, to direct attention to fully convinced that many properties I know of and could secure would in their proper development remunerate as handsomely, proportioned to the outlay, as the most popular dividend-paying mines of the day. When properties of the staple class, considered in respect of the essential qualities of natural conditions, can be acquired in royalty or a moderate and reasonable share of the profits, it appears to me reckless beyond measure to pay enormous sums of money for mines of whatever kind or description, as in a brief space of time the cheaply-procurable and purely meritorious properties would probably outstrip and utterly eclipse the more loudly pretentious and most exorbitantly purchased mining schemes, many of which in way of romance are designated mines. In almost every other enterprise progress and returns are apprehended by a rational process of thought, critically scanned and deliberately acted on with niceness of discrimination and comprehensiveness of judgment in detail, probabilities are espoused and ratified from the analogy of correspondence or disparity of similar or otherwise conditioned verified mining enterprises and establishments, which behoves to be honoured with their true weight and significance.

The rationale and proper conduct of business, whether industrial or commercial, is not accomplished on a lower plane than this. But in mining what do we see? Principles ignored, analogies disregarded, and consequences braved with a recklessness appalling to astutely sober-minded men of prudent business proclivities, habits, and practices. If mining differs from most other industrial pursuits in the apparent or real abstruseness of its fundamental and vitally sustaining sources and the principles or laws which govern them, and are more difficult of elucidation from the lack and absence of familiar objects of illustration of its phenomena outside of its own sphere, its business department differs not in kind from that of all or any other pursuit, whilst that which regulates or should regulate its experimental or practical working is, as in all other enterprises, knowledge acquired from experience—ocular, analytical, scientific, and practically demonstrative. The science of mining is as yet unwritten, probably because it is indefinable, except to a very general and superficial extent; but some of its important auxiliary branches have been written and elaborated with commendable fidelity and truthfulness, a knowledge of which, associated with other knowledge of practical import, is of great utility and value. The theoretic formulas of correct mining follow after rather than precede practical experimentation, as until something of the nature of objects is known no sufficient basis for theory concerning them can possibly exist. Theory ratiocinates, and reason, if not Nature, abhors a vacuum intellectually. ROBT. KNAPP.

Ione, Nye County, Nevada, Feb. 11.

GOLD AMALGAMATION.

SIR,—I fear I must trouble you with a few more words on this vexed subject. Let me restate the fact that I am no enemy of Mr. Moon's or of his amalgamator. I really had no clear idea of its action until I read "Civil Engineer's" letter to-day in the Journal, and I did not know that Mr. Moon had published a pamphlet thereon, or I would have done my best to get it. Unluckily in this (it may be) useless discussion Mr. Moon very adroitly shirks the point at issue—that of getting by his amalgamator, with pure mercury only, the very last particle of gold contained in minerals, no matter what it may be in combination or association. Unhappily, I do not think he can, and, therefore, we are in opinion on this head, as far as the poles asunder.

Mr. Moon, however, has arrived at Leicester, and brought what he considers further proofs in support of his unique assertion of the wave-plate amalgamator. Mr. T. W. Valentine, of Boston, Mass., writes (Feb. 7):—"It is the best amalgamator ever made." Mr. Wm. M. Treglown, of New York, writes (same date):—"I find it the simplest and most economical machine in practical use. They are treating with your machine oxidised sulphurets direct from the furnaces, and were amalgamating 90 per cent. of their assay value." Now both of these mining experts imply that they have seen all the amalgamators in the wide world, know all about them, and have come to the conclusion, with Mr. Moon, that his is the best amalgamator ever made. Assuming this to be "O. K.," it has nothing whatever to do with the bone of contention. There is, however, something approaching it in Mr. Treglown's certificate, where he says:—"They are treating with your machine oxidised sulphurets direct from the furnaces, and were amalgamating 90 per cent. of their assay value." If I believe in the 90 per cent. result that is no reason why I should jump down Mr. Moon's throat in the belief that 90 equals 100, for he claims supremacy at the last particle.

Besides oxidised ores direct from the furnaces, with their more or less liberated gold, are certainly not crude ores direct from the mines. The states of the ores are very unlike, and I, therefore, put it plainly to Mr. Moon, as he will have it so:—Sir, if your wave-plate amalgamator only gets 90 per cent. of the contained gold from oxidised ores (presumably freed from sulphur, arsenic, &c.) is that any proof whatever that you could have got 100 per cent. of the gold had you operated on those very ores before oxidation? In any case this vaunted certificate, as of proof, is at the least 10 per cent. short of the last particle, the ability to get which Mr. Moon so loudly claimed at the outset of the squabble. The wave-plate machine may really be the best amalgamator ever made for all that. I do not say that it is, because I do not know. But when Mr. Moon insists on our swallowing that which is scientifically doubtful, as well as distasteful, he should not get irritated if wry faces are made about taking the dose he rather peremptorily prescribes.

I hardly know how to remark on the first two paragraphs of his letter, the ideas having got rather mixed and non-amalgamable.

In my previous notice of the Prince of Wales Gold Mine, years ago the scene of Mr. Moon's labours, I wrote as to the very fine flour-like gold found there, "that everybody then failed at its economic extraction." This was true enough. It has been said that the history of failures is the history of success. This, also, is true with a modicum of qualification. Mr. Moon submits my quotation above to his correction as if an error. His attempted correction, however, I am at a loss fully to understand. He writes, "the only failure that attended my labours in Wales was produced by handling mercury in an unusually wet season, in an exceptionally wet district." I happen to know, from long experience, a good deal about this exceptionally wet district. Now, clipping off the exceptional wetness of the period, I cannot see what failure could possibly arise from merely handling mercury in a wet season, however wet. That, at times, he got gold at the rate of 17 ozs. to the ton by amalgamation I have no doubt, for I have myself accomplished a good deal more than that.

I must in justice to Mr. Moon say that I never heard the slightest slur cast on his management of the mine, nor a word against the machinery he erected. In his letter Mr. Moon gives a very flattering certificate in his own favour, when he solemnly asserts, "I can truthfully say a finer mining plant for reducing ore was never got to work." This may be true to the letter. I do not know that it is not; but Mr. Moon only says that its use was for "reducing ore." This I take it does not go quite far enough, as to certifying to its excellence for amalgamation. There is the rub. This reminds me of the climax of a 20-guinea report on this very mine by an experienced expert of the time. It is this—"If a certain amount of capital be judiciously expended on this property, it will render a profit commensurate with its capabilities." There is the very perfection of fun in this sentence, for one has to read it two or three times before discovering the exact truth it holds. The temptation is very strong to cry out, Eureka on its discovery!

In the second paragraph of his letter, Mr. Moon is betrayed I think into a double-barrelled inaccuracy as to the mercury loss by some of his successors at the mine works as compared with what he himself lost during his operations. As he puts it, it stands at 3½ tons to 1 lb. His own words are:—"I was informed that more than 100 flasks of mercury had been lost in the tailings; whilst I was there not more than 1 lb. had been lost from all causes." A superficial reader might get an impression from this very marked contrast that Mr. Moon was then using his wave-plate amalgamator, which, however, could not have been the case. It is obvious that if he lost only 1 lb. of mercury from all causes put together in what he

says was a wet season, and, therefore, unfavourable for amalgamation, he must have got all the gold his mercury was capable of getting from the ores, and I know that he did not get all the gold contained in the ores any more than his predecessors and successors. Therefore, he must I fancy be said to have failed like the rest of us at its "economic extraction." This is, however, not a bit to his discredit. He failed at it in tolerably good company, and people know a good deal more about the subject at the present time.

A lot of sterling Sheffield blades, the pluckiest mine adventurers ever known I think, stuck to that mine for a number of years without profit, simply because the mixed ores would not part with their gold satisfactorily to any of the processes of amalgamation as then applied. I lost money at it myself. I do not know whether during Mr. Moon's régime or not, and that is one of the many kinds of gold occurrences which acts as a stimulus to the recollection.

Brixton, March 1.

T. A. READWIN, F.G.S.

COPPER ORE STANDARD.

SIR,—Many of your readers, as well as myself, would feel very interested if any of your readers would explain how the Cornish assayers ascertain the average price and the standard for 9 per cent. produce, *re* copper ore sales at Swansea and in Cornwall; and when the standard and price for 9 per cent. produce is obtained how the price for any other produce is arrived at, the returning charges being given (say) at 45s. I have Mr. James Davey's Tables, second edition, 1845, from which I gather that when the average price and produce of the whole sale is known you can at a glance see what is the value of any other produce. For example, suppose the average produce of the sale was 9 per cent., and the price 51. 7s., the returning charges for Cornwall being 21. 15s., the standard in this case would be 90%, and the difference in price for each produce 15s.; therefore, 7 per cent. produce would be worth 31. 17s., or 30s. less than 9 per cent. produce, and so on for every unit of produce up or down. Mr. Davey states in his prefix to these tables, if 10s. be added to the prices given in his tables it will be the value of ores at Swansea. All this is very clear so far to any reader, but it does not agree with the prices given by an assayer to his clients, based on the published accounts of the copper ore sales in your valuable Journal.

For example, I will take the account published in the *Mining Journal* of the sale at Swansea, Feb. 27, 1873. Tons of ore, 1075; assay produce, 8½; fine copper, 89 tons 2 cwt. 3 qrs. 6 lbs.; price of ore, 41. 12s. per ton; price per ton of fine copper in the ore, 551. 19s. 11d.; total value of sale, 4991. 13s.; standard for the whole sale, 9 per cent., 51. 17s. 4d. The standard 81. 17s. 4d. multiplied by the produce 9 per cent., divided by 100, less 21. 15s. the return charges for Swansea gives the price for 9 per cent. 51. 2s. 4d., from which price deduct 10s., according to Mr. Davey's note prefixing his table, and one should at once be able to get the value of any other produce based upon this sale. Thus 51. 2s. 4d.—10s.=41. 12s. 4d. On referring to the said tables I find that 9 per cent. produce, the standard for the same produce is 82½, and the price 41. 12s. 7d.; and for the following produces:—6 per cent., 21. 12s. 4d.; 5 per cent., 17. 19s.; 4 per cent., 17. 5s. 9d.; 3 per cent., 12s. 2d. Adding to these prices 10s. should give the value of such produces at Swansea. Thus, for 6 per cent., 31. 2s. 4d.; 5 per cent., 21. 9s.; 4 per cent., 17. 15s. 9d.; 3 per cent., 11. 2s. 2d. Whereas the prices given by the assayer referred to in this letter do not agree with these prices. Thus he gives for 6 per cent. produce 31. 6s.; 5 per cent., 21. 13s.; 4 per cent., 17. 3 per cent., 17. 7s. From what I have said you will at once see my reasons for asking the questions at the commencement of this letter.

Morriston, March 4.

C. W. J.

EMPLOYERS' LIABILITY ACT AMENDMENT.

SIR,—The bill to amend the Employers' Liability Act, which has been brought forward by Mr. Burt and others, and is to be read a second time on May 7, is nearly similar to that thrown out by a considerable majority last year. The main provision appears to be based on the German law relating to mines, quarries, and railways. After reciting that the provisions of the Act of 1880 shall have effect and be enforced in every Court in every case, notwithstanding any contract or agreement to the contrary, excepting such as have been made before the passing of the proposed Act. As to the assessing of damages, it is provided that, in determining the amount of compensation, the Court shall take into consideration the value of any payment or contribution made by the employer to or for the injured person in respect of his injury, and also the value of any payment or contribution made by an employer to any insurance fund or compensation fund to the extent to which any person would otherwise be entitled to compensation under the said Act, has actually received out of such payments or contributions at the expense of the employer. The proviso, as before stated, is evidently copied from the German law on the same subject. The fourth section of the German Act of 1871 states that if the killed or injured was insured against accident in any insurance office, miners' fund, relief fund, miners' sickness fund, or any similar fund to which the owner also paid premiums or other contributions, then the payments from the fund to the person entitled to relief are deducted from the compensation. The similarity between the above and Mr. Burt's proviso will be apparent. In the bill of Mr. Burt it is also provided that an action shall not, except by consent, be removed into a Superior Court unless the amount claimed exceeds 100l., whilst the Court in which an action is commenced or is pending may, at any stage of the proceedings, amend any defect in the notice of death or injury, or direct that the action shall proceed and be maintainable should such notice not have been duly given, or at all, if the Court think well to direct so. Such are the principal provisions of the Amendment Bill in the Act which thousands of workmen have found to their advantage to contract themselves out of. Miners in nearly all districts are connected with such permanent accident funds, to which the mineowners contribute most liberally; but, should Mr. Burt's bill be carried, they would withdraw from them, to the serious loss of the workmen. But there is every reason to believe that this second attempt to deprive workmen of the liberty of arranging with their employers will meet with the same fate as the first one, and none will be more pleased at this than the workmen themselves.

Barnsley, March 5.

THE HALKYN LEAD MINES.

SIR,—These mines occupy a prominent place in the history of the metalliferous-producing strata of North Wales, and in the past they have ranked amongst the richest in the kingdom. From one main lode in this Pantygo property it is reported that profits have been realised by the ancestors of the present Duke of Westminster of 100,000l. per annum for years. I need not recapitulate the motives which suggested the unwatering of this section of the mineral range of Flintshire, for the extraordinary success mentioned above amply justifies an undertaking of such magnitude, and with this object in view an adit level was commenced from Nanty Flint by the Grosvenor family, and continued by successive companies to Pantygo, which lode it intersected at a depth from surface of 216 yards. This adit in its progress intersected the Crockford's north and south lode, in which it was continued to and beyond Lewis's shaft to the great Pantygo lode. I should here mention that when Crockford's lode was entered by the adit it was found rich in ore, which continued productive and profitable to a point south and slightly beyond the Pantygo lode, a distance of nearly three-quarters of a mile.

The bearing lime rocks which yielded the ore in Crockford's lode rise considerably over the adit or tunnel in the vicinity of Lewis's shaft. The measures in which the tunnel is driven there, and indeed all along its line in this property, are the primitive limerocks, which may be termed a non-producing lead strata, so that the rich producing rocks are overheard along the tunnel, both in Crockford's and Bryngwlog lodes. It is well to note this, for it has an important bearing upon the future of these mines. The drainage tunnel, a continuation of the above adit, is the outcome of an Act of Parliament to unwater the Halkyn, Rhosmor, and Mold mining districts, which has already been driven through this mining property from north to south, mainly in the Crockford's lode, which has exposed a long length of ore ground, and completely drained all the lead-bearing sections, affording at the same time every facility for trials in the several lodes exposed by same. Two well-known cross-

courses exist in this property, running north and south, and what is an exception to the general rule both have yielded rich and profitable ore runs—one being the Crockford's lode, and the other Pantygo, both comparatively untouched in this mine.

There are other north-east by south-west lodes discovered by the tunnel on the east of Crockford's with most promising features whole and unexplored. Two champion east and west lodes known as Pantygo and Bryngwlog traverse this property from end to end. The latter is unquestionably the most masterly of the two at the depth of the tunnel, showing, as it does, greater strength and character than the former at this depth, and it is whole and untouched in all the bearing strata, an important feature. There are, besides other east and west lodes, which have been intersected by the tunnel between Pantygo and Bryngwlog that may, judging from appearances in the primitive lime, prove rich and important additions in the best bearing measures above.

The Bryngwlog lode was intersected by the tunnel in the primitive lime, where it is highly mineralised, and, as I have before intimated, compares advantageously with the celebrated Pantygo on this formation. This was the position of the mine at the time the present company entered upon the development of its resources, and it is worthy of remark that seldom, if ever, has a company entered upon an undertaking of this kind with so much work accomplished by former proprietors in the solution of such an interesting problem. In the development of this property the company adopted the most approved modern appliances and skill, by the application of steam power in lieu of hand labour, in driving levels, stopping ore ground, &c., which have been accomplished in a manner at once effective, comprehensive, and equal to the requirements of a great mine. In addition to the plant purchased from the previous company, a powerful new engine and compressor have been erected, replete in all scientific arrangements, with the object of economising fuel, and I can, from personal observation, attest to their efficiency and success in work.

The drilling machines are in every respect equal to the best I have seen, and this remark will also apply to the boiler, air receiver, line of pipes, and their fixings, and to all mechanical arrangements for heating water, &c., by which the coal charges are reduced to a minimum. The water in the tunnel has been bridged over for a length of 800 yards, for a main tramway to Lewis's shaft, the tramway is completed, the shaft furnished with cage and guides, &c., and the whole is accomplished in a most skilful, cheap, and comprehensive manner, by which underground visits are made easy and pleasant, and all material delivered on surface with great speed.

The mode of operating upon Crockford's lode is now being carried out in compliance with arrangements made with the Drainage Company, rises in which have already proved to demonstration the existence of rich and increasing ore runs. They increase as height is attained, particularly in No. 1 and 2 rises, the latter having opened ore ground for 20 yards high, averaging 3 tons per fathom. From these operations alone 80 tons of ore have been raised, showing what may be expected when the plans are matured for a system of stopping, to facilitate which the Drainage Company could do much by allowing this operation to commence from the tunnel direct, with decided benefit to that company without injury to the property. A main driving by machinery has been commenced in the Bryngwlog lode, both east and west of the tunnel, with unrivalled success, accomplishing from 50 to 60 yards per month through hard and most difficult ground, in which the maximum that hand labour could drive would not exceed 8 yards.

The advantage of this must be apparent to all who give the matter consideration, as surface charges, salaries, office, and other incidental expenses, must be divided over 50 or 60 yards, instead of 8, which means adding 8l. or 10l. per yard to the cost of hand labour, besides which, doing in one month by machinery what would take eight or ten months to do by hand labour. Appearances all along the lode exposed by the levels driven in the Bryngwlog lode denote great strength and character, but it is from end to end, as I have before described, in the primitive limerocks, and consequently below the great ore runs. Indeed, since I saw this driving a rise now being made on the west of Drainage tunnel has already entered ore ground of the value of 15 cwt. per fathom of lead, besides blende—a very important feature—and warrants the opinion of the existence of great ore bodies in the measures above.

The levels in question will, if continued, intersect the best ore-bearing strata, both east and west, as the measures dip east and west, so that scientific mining points to the continuance of both ends. I think, however, the manager is wise in first piercing the rich ore-bearing strata above, so as to ascertain the disposition of the ore runs that unquestionably exist in this fine lode before prosecuting the same with vigour.

Judging from past results and successes attending the efforts made at all points in rising both in the Crockford and Bryngwlog lode above the tunnel, where paying ore courses have been exposed and increasing in value as height is gained, and of the existence of ore runs already proved for great lengths in the several lodes, I consider that a great and permanent success is established, that will increase in importance as the development proceeds.—Chester, March 4.

C. E.

LEAD DISCOVERY IN MERIONETHSHIRE—THE HAFOD-Y-SPYTTY MINERAL PROPERTY.

SIR,—It is gratifying to be able to state that the above mineral property continues to yield good lead ore, and since the statement made by "W. W. W." in your Journal of November last, relative to the discovery, the lode has been further opened upon in different places, and from which rocks upwards of 1 ton in weight have been broken, and found exceedingly rich in lead ore. When the necessary appliances for dressing the ore are completed the enormous quantity of leadstuff accumulating will be prepared for the market, and even at the present low price of lead the property cannot fail to pay well, there being ample water as motive-power for all purposes. Further, the lode can be wrought without the aid of pumping or winding machinery for upwards of ½ mile in length, 100 ft. in height, and upwards of 30 ft. in width, the whole of which yield lead ore more or less. In fact, the lode can be quarried from the surface to the adit cross-cut; this will be taken away at an unusual cheap rate, and having surveyed most of the principal mines in North and South Wales I venture to say that such a mineral property as this has not hitherto been discovered in the Principality, and when got into fair working order the returns will speak for themselves. A small rise in the price of lead would considerably enhance the intrinsic value of not only this property but many others now suffering from the depressed state of the lead market. It is to be hoped a change for the better is not far distant, when lead mining will again take the lead in the world.

Slate operations on the valuable slate veins in other parts of this property, which is about 500 acres in extent, will, it is anticipated, be resumed, and it is the opinion of the best slate authorities in the Festiniog district that this property cannot fail to become very lucrative in the production of slate, and however glowing my remarks may appear, an inspection of the property would convince any expert as to the great value of this mineral grant, if worked vigorously and economically.

GEORGE SPARGO.

Festiniog, March 4.

LEAD MINING, AND ITS PROSPECTS.

SIR,—With interest I have read the letters respecting the lead trade, and having travelled for some years I lately passed through a district abounding in mines, and the thought coming into my mind of former visits when activity and life were present, and the ear was met by the busy sound of the blacksmith's hammer, I must say that a feeling of depression came over me. Mines abandoned, others with bailiffs in possession; machinery for sale, villages almost depopulated.

From whence, then, are we to look for the cause? Is it to Free Trade, which permits all nations to supply us free, or the shortness of money in other countries which compels them to force on (perhaps to the future total ruin of the mines) the production of ore without opening out fresh preserves. Free Trade is undoubtedly good when you have the command of markets; without this, reci-

procity, in my opinion, is the only means of protecting the trade of the country. What, then, have we to hope for in the future? Simply a decreased production from the ruin of others and the eventual collapse of many foreign mines. I opine, therefore, that ere long an advance will take place, and those properties which are able to tide over the present bad times will reap a rich reward. M. C.

Mining-lane, March 3.

LEAD, AND ITS PRESENT DEPRESSED PRICE.

SIR,—May I be allowed to suggest through the columns of the *Mining Journal* what I think about three years ago was reported at a meeting of Tankerville shareholders as likely to be done towards supporting and enhancing the then depressed price of lead. I mean the suggestion of the formation of a strong company or syndicate to buy up and store up lead as it comes into the market till such times as a better price could be obtained for the metal. Of course, while having such in stock the money invested need not lie idle, advances could be made on it as required in the same manner as advances are made on other kinds of stock in store. Not so very long ago it was reported that such a syndicate had been formed by an influential body of men, when immediately upon the rumour up went the price of lead, to full, alas! as speedily upon the discovery that such was a false report. I merely mention this circumstance just to show how such a proceeding, or rather simply the report of such, did and would I feel assured, not only *pro tem.*, but permanently, benefit the at present disastrously depressed price of lead.

Dorchester, March 5.

F. S. C.

WIRE ROPES IN WINZES.

SIR,—Notwithstanding the various purposes to which wire ropes are now applied in mining operations, as well as other industries, I am not aware that they are very generally used for winding with the tackle in winze and shaft sinking. Indeed, many mine agents have expressed some surprise when I have mentioned the matter, and would scarcely believe that it could be so applied until convinced by an ocular demonstration. Having had a steel wire rope made by Messrs. John and Edwin Wright, of Birmingham, 2½ in. diameter, to work over a 2 ft. drum, it occurred to me that a steel rope of sufficient strength could also be made to work over a 6 in. barrel, and in order to test this I got one made by the same firm ¾ in. diameter, the breaking strain of which was over 3 tons, and which answered so admirably that I have used nothing since. That is some years ago, and I may say that although we have had the same ropes in constant use for a year we never wore one fairly out. They have only become unfit for use by laying aside after that time.

The advantages of the wire rope for this purpose will be clearly seen, and may be summed up in a few words. They were more than five times as long as hemp ropes. The men all say that they can draw a third part greater weight. The first cost is less than a good Russian hemp rope, and they are double as strong as the hemp rope generally used, and any weakness or defect can be detected immediately, which is not the case with hemp ropes.

Llanerst, March 4.

JOHN ROBERTS, M.E.

NORTH BOVEY MINING DISTRICT.

SIR,—I observe the remarks from the Chairman of Wheal Benny in the *Mining Journal* of Feb. 16 that the wheel and stamps have been brought to work, and, judging from the samples of tinstuff that I have seen, and from the best reliable sources, the prospects are very good indeed for a lasting and profitable mine. I should like to see more attention given to other valuable property about the district, also for tin mining in the parish of North Bovey. I know of a young mine having sold upwards of 40 tons of best quality tin at only 20 fathoms deep, with a good lode in the shaft sinking below adit. In a new sett adjoining a thorough trial has been made with good results on two lodes, and there are at least four other well-known productive lodes; and the whole may be developed with adit levels from 40 to 50 fathoms deep. There is water-power for stamping the tinstone and dressing purposes, with other good advantages for cheap and profitable working; and, taking into consideration the high produce per ton, and no burning required in cleaning the tin, it is believed the same can be rendered marketable under 80l. per ton, which, of course would leave a very excellent profit.

North Bovey, March 5.

C. H. M.

CORNISH MINING—THE GWENNAP DISTRICT.

SIR,—For centuries past around the great granite upheave of Carn Marth the research of the miner has now and then been attended with success; another instance is afforded of a lode, the surface outcrop of which produced mineral, increasing more and more on deeper working, until at the depth of only 40 fms. close upon 3000l. worth have been sold. In my experience I have never known a productive mine unless led to by shallow bunches; indeed, they are the blossom offshoots of the great trunk below. It is being carried on in a quiet way, the holders being fully alive to its ultimate value, and I venture to predict within the next six months the price of shares will so enhance as to represent the nature of the discovery which may be looked for at any moment. Strange to say, such is the apathy towards mining, the shares are quoted at the nominal price of 1l. 10s. each, or 9000l. for the entire property; the cutting of the lode rich in the next deeper level within the coming two months would (as in the case of Dolcoath and East Pool, some 3½ years since) cause the price to go a 1000 per cent. higher. Here is a splendid chance for the investor, its present depth is, moreover, just where the greatest mines of Gwennap commenced being ore producing, proving more and more productive in depth, and paying larger profits than any mines in the districts of Cornwall.

St. Day Scourier, Cornwall, March 5.

CHARLES BAWDEN.

CORNISH MINING: ITS UNWROUGHT GROUND—GREAT WEST SHEPHERDS.

SIR,—I have long advocated working new ground, and that for two reasons—the greater chance of making discoveries, and the less expensive way of attaining such object. But, unfortunately, for the want of knowing the mineral producing from the non-mineral producing rock much useless expenditure and consequent failures have occurred. To the experienced eye the difference is easily discernible. On the line of lodes that have given millions profit there are sections of ground requiring to be explored to equal in productiveness any hitherto discovered. As a rule, the mineral which causes the true gossan (surface outcrop, quartz and peroxide of iron) if found mixed with it in small quantities at a shallow depth may be taken for the guide to the main deposit at an increased depth. In the case of Devon Great Consols the writer remembers the outcrop producing copper ores at surface, increasing in yield in depth until it led into one of the greatest deposits of mineral known within the present century. Dolcoath, one of the richest and deepest metallic mineral producing mines in England, at Wheal Killas and Old Sump shafts showed close to surface indications leading to the great storehouse, below which to the present has produced mineral wealth enumerated by millions.

Again, United Mines and Tresavean, where the mineral cropped up to surface, leading to results which made the Gwennap district famous in the history of mining. It was in this way our rich mines were discovered, and it is this way equally rich mines are to be discovered. Founded on these facts I grounded my remarks in last week's Journal with reference to Great West Shepherds, which has the same essentials. It is of rare occurrence for such instances to fail, while the expense of working is trifling, and the enterprise divested of all speculative character, thus rendering it a safe investment for capital, and whoever co-operates in its development will be rewarded with like results. A little over three years ago I wrote strongly my conviction of East Pool Mine as likely to become permanently productive. There shares then stood at about 9l. each, since which over 60,000l. have been distributed in dividends, while the price now stands at 40l. per share, and I venture to predict a corresponding rise in the value of the mine here referred to—Great West Shepherds.

CHAS. BAWDEN.

St. Day, Scourier, March 5.

REPORT FROM CORNWALL.

March 6.—There is something more than the steadiness in mining affairs, which we noted last week, to report this, for a decidedly more sanguine feeling is abroad, and a remarkable amount of confidence is experienced in the opinion that the tide is on the turn. This is not only the result of the decrease of tin stocks announced for February—figures of this kind have proved delusive ere now, and may again—but there is a strong belief that the supplies from the Straits are on the decrease, and that it is to Cornwall that the world will have to look to supply the steadily-growing consumption of this indispensable metal. It is also a notable fact that Cornwall has never been in a better position to meet the demands that may be made upon her.

Once more Capt. Josiah Thomas has had the pleasure of reporting that the lode in the bottom of Dolcoath is looking "better than upon any previous occasion," and what is equally to the purpose the adventurers are at length beginning fairly to reap the advantage of the improved produce from that quarter. They are to be congratulated also upon having had the courage to take the first definite step towards wiping off their debt, and upon their resolution to get rid of the accumulated debit balances so far as they do not represent available assets. We are sorry that our congratulations cannot cover the whole of their financial position, but that is hardly the fault of the management. Capt. Thomas tells us that as a result of the doing away with the much-attacked "smelters' monopoly" in Dolcoath produce and taking the tin to the open market 12s. 6d. a ton less is realised, and that he does not think a return to the old arrangement possible. Probably not. When a firm can buy at 48s. 16s. 6d.—the average of the past quarter—they are hardly likely to volunteer 49s. The loss is an important one, seeing that the mine is now raising considerably over 500 tons of tin a quarter, but the fact has to be faced. The output is really marvellous. The 537 tons raised in the last quarter is not only a far larger quantity than any other mine ever produced, but 70 tons in advance of any similar period for Dolcoath itself. The excellence of the management is specially seen, however, not in the quantity produced, but in the fact that the stuff raised—and much of it from a depth of just 400 fms.—is landed at surface at an average cost of 4s. 3d. a ton.

Examination of the accounts shows that Mr. Basset's nominal "fifteenth" dues on returns means an actual fourth of the entire profits, and something more? The mere statement of this fact seems enough to show its preposterous character; and then, if the Assessment Committee of the Union can arrange it, the adventurers are also to be saddled with rates on the 25,000*l.* fine. We are glad that, whatever the event, they have made up their mind to resist. It has been pointed out that it is as absurd to charge the mine with rates on its purchase fine as it would be to charge the leaseholder of a house with rates on the purchase-money of his premises; and that if anyone is morally liable it is Mr. Basset. However, it is well, as Mr. Lanyon said, that the adventurers should know their true positions.

We are inclined to think that even at Tehidy it must now be seen how thoroughly mistaken the recent policy has been. We attribute it to not a little of the present depression, which would never have reached its lowest depth but for the shock caused to public confidence—and it is very clear that the direct effects will not pass away for years. There seems to be a vitality of mischief in this "fine" that even its staunchest opponents could never have imagined to be probable.

There is quite a mining revival in the border district which is bisected by the Tamar. Steady progress is made by nearly all the mines around Tavistock, and by several of those about Hingston Down. Now it is Gunnislake (Glitters) that is steadily, if slowly, making headway, the profit in the last quarter being 250*l.* If encouraged by the Duchy it is intended to sink the shaft here another lift. Further west there has been another marked improvement, valuable discoveries having been made in the western part of Phoenix United.

The storm at Killifreth, caused by the circular of Capt. Trevethan, has so far ended as everyone expected, the great bulk of the shareholders, present and by proxy, being on the side of the management. Now the charges are to be investigated by a committee, and though this met with opposition few who are interested will feel otherwise than satisfied with the selection made, and confidence in whatever report they may present. Further comments at present would be out of place.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

March 6.—The state of the Coal Trade does not improve. Coalmasters report this week that prices have to be cut 2*ns* rather than ever if orders are to be obtained, since competition is increasing. When a colliery proprietor finds that his neighbours are taking lower and lower rates he has no alternative but to follow suit if he wishes to keep his connection together. Thus it comes about that upon Cannock Chase as low prices are now being accepted as 5s. to 5s. 6d. per ton for common forge coal, and 6s. to 7s. for mill coal. Steam coal is 4s. 6d. to 5s. Staffordshire forge coal is 6s. 6d. to 6s., and furnace sorts 9s. 6d. to 10s. The pig-iron trade does not improve, but vendors anticipate a better business in two or three weeks' time. Prices stand at 80s. for native cold-blast pigs, and 60s. for hot-blast. Part-mines are 47s. 6d. to 45s., and cinder pigs 42s. 6d. and 37s. 6d. on the Dudley side of the district. Merchant orders for finished iron are somewhat more numerous on the week; but prices remain bad upon the basis of 7*l.* 10s. for marked bars, and 8*l.* for galvanising sheets (doubles).

A large meeting of manufacturers was held at Birmingham (Thursday) afternoon, to hear an address on Railway Rates by Mr. W. Hunter, of London. The author announced that Mr. Chamberlain had promised to bring in a bill giving permanent appointment to the Railway Commission, a *locus standi* before it to trade associations, and powers to allot damages and grant injunctions in preferential cases. It was resolved not to cease agitation until the bill is passed.

On Thursday afternoon a special meeting of the sheetmakers was held in Birmingham to consider the possibility of restricting the output, with a view to get up prices. A resolution was passed to the effect that the present low rates rendered a restriction of the make desirable, and a committee was appointed to consider the best means of carrying the resolution out.

Advance returns which have reached this district show the make of iron in the past year to have been—In South Staffordshire, 394,000 tons, a drop of 4443 tons on the year; North Staffordshire, 285,357 tons, a drop of 31,760 tons; Shropshire, 71,000 tons, a drop of 9457 tons; and Northamptonshire, 200,995 tons, an advance of 8,881 tons. The great drop in the make in North Staffordshire is mainly due to the late strike of miners there. The stock of pigs held at the same date is set down at—In South Staffordshire, 55,600 tons, an increase of 16,798 tons; in North Staffordshire, 52,495 tons, an increase of 4972 tons; Shropshire, 22,000, an increase of 500 tons; and Northamptonshire, 31,892 tons, an increase of 13,172 tons. The larger proportionate consumption, almost yearly, of Northampton and Derbyshire pigs, on the one hand, and of the pigs smelted in the hematite districts on the other, quite accounts for the growth of the stocks of South Staffordshire crude iron.

At a meeting of the Institute of Mining Engineers, at Dudley, on Monday, the President (Mr. A. Sopwith) resumed the discussion upon his paper "On the Depreciation of Colliery Plant." He repeated his desire to find a ready and a tolerably trustworthy system of determining the depreciation of colliery plant without going to the expense of an exhaustive inspection by a professional valuer. At the close of the discussion the President said he thought the best plan would be to equalise matters, and have a tangible method of calculating the depreciation. An application was received from the Royal Miners' Life Saving Institution asking that a member of the Institute should be nominated as a Vice-President, and that two members should be elected to the Council. The President remarked that it was a carrying forward of the work of the Fleuss system, but upon the suggestion of Mr. E. B. Marten, it was determined to make further enquiries into the scheme before taking any definite action. Mr. Marten obtained the consent of the Institute

to the loan of old maps of coal fields, maps of old methods of getting coal, old tools, old means of lighting, and similar objects to be set out at an archaeological meeting which is to be held in connection with the Wolverhampton Fine Arts and Industrial Exhibition in May next, and at which it is proposed to have specimens of the archaeology of mining.

A special meeting of the South Staffordshire Mines Drainage Commissioners was held at Wolverhampton on Friday to elect a Commissioner in the place of Mr. Arthur Keen, disqualified by reason of his non-attendance. It was explained that the non-attendance was caused by pressing business engagements, and that Mr. Keen would endeavour, if re-elected, to satisfactorily fulfil the duties of the office. On the motion of Mr. Walter Williams, Mr. Keen was re-elected, and after postponing the customary monthly meeting until April the Commission adjourned.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

March 6.—The machinery for two complete slate-making mills for a slate quarry in Australia is in the course of construction at Messrs. De Winton's works in Carnarvon. We do not know what the character and quality of these Australian slates are, and probably they are too far off to affect our home slate trade. American and Italian competition seems to have quite died out. A committee has been appointed to promote the extension of the Bangor and Bethesda Railway to Llandinollen, a populous slate quarrying region, to the population of which such an extension will be valuable.

The marble limestone quarries on the Menai side of the coast of Anglesey have been taken by a company who propose to work them vigorously. There is a little slate quarry extension in the Corris Valley, Montgomeryshire; but most of the isolated slate quarries—those at a distance from the great centres of production—are not doing very well.

In the case of H.M.'s Inspector against the Bersham Colliery Company, near Wrexham, the case has been dismissed, each party paying its own costs. Very important rebutting evidence was given by several well-known mining engineers, and the magistrates could not agree. A further charge was preferred against the manager for not providing man-holes on an incline. The magistrates held that while the safety of the men was provided for there had been a breach of the law, and would only impose a nominal fine of 1*l.* and costs. The failure of the prosecution in the first case gives considerable satisfaction in the neighbourhood. The owners of the Buckley Collieries have given way, and will not insist upon the 10 per cent. reduction in wages, of which they had given notice.

The Coalbrookdale Company threaten to close their iron works at Horsehay, and have given 28 days' notice to the men employed. Meetings are being held between the masters and men, but no settlement has as yet been arrived at. There have been accidents at four of the collieries of the district this last week, but none of them fatal.

Petitions and cross petitions are being presented against the several bills which have to do with the conservancy and the crossing of the River Dee, and we must wait to see what will be unravelled out of what now seems to be a tangled skein of cross purposes.

At the recent annual meeting of the Wrexham, Mold, and Connahs Quay Railway it was shown that the financial position of the company is brightening. The receipts for the past year were 2000*l.* more and the expenditure 3000*l.* less. A dividend of 4 per cent. was declared on the A debentures, and of 3*½* per cent. on the B stock, and a contract has been accepted for the doubling of the line. The Mersey Railway Company have obtained all the money they asked (116,000*l.*), and their present capital is 550,752*l.* Various negotiations are proceeding with the great companies as to the uses they may make of the line. It may be mentioned incidentally that in driving the tunnel from the Liverpool and the Birkenhead sides the centre lines met within 1 in. Of lead and copper mining there is nothing to be said this week. One interesting incident of the week was the opening of a passenger station at Sandcroft in connection with the wants of the great manufactory of mining and other machinery established there.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

March 6.—Mining operations in Derbyshire have undergone very little change of late. In the lead districts work has been of a rather uniform character, and no startling discoveries have been made, it is said, since that at the Magpie, which turned out so disastrous for all connected with it. Some few mines continue to do well, but the bulk of them raise comparatively little ore. Not much ironstone is now raised in the county, long trains on the Midland being seen daily running from Northamptonshire to the stations and sidings connected with the different ironworks. The small county of Rutland is now sending a fair tonnage of stone as well, being similar to that raised in Northamptonshire and Lincolnshire, and is evidently found to be more economical than the stone of the coal measures formerly extensively worked at Staveley and other places. The collieries have been working much as usual, but the demand for house coal has not improved, although one or two collieries have, perhaps, sent rather more to the south during the last few days. Trade with the Metropolis has kept up to about the average, but that is not saying so much, for during the last five or six weeks the falling off was of a decidedly marked character, whilst prices were also materially affected. Silkstone coal is delivered as low as 22s. per ton to consumers, and even that price is higher than it should be considering the amount realised at the pit.

Colliery owners cannot now be said to be making profits, leaving such for the metropolitan merchants. But it is now likely that a change will take place before long, and that the producers will become the sellers direct. The movement on foot for that purpose has been warmly received, and a strong effort will be made to carry it out. The opposition will, of course, be strong, and last some time, but a combination on the part of the colliery owners is all that is required to ensure success. Steam coal continues to go off tolerably well, although this is by no means a busy part of the year. But some owners hold good contracts from the railway companies for locomotive coal, and this being continuous is a great help. A considerable quantity of the same coal is also required for the ironworks, but a comparatively moderate tonnage is sent away for ordinary purposes. The gas companies are now taking less under their contracts, and will continue to do so. In small coal there has not been much change, but as the collieries in several districts are only working about four days a week less slack and smudge is made, and this brings production and demand nearer to each other than would otherwise be the case were full time the rule. The ironworks have worked very fairly indeed, and the output of pig has kept up well, although prices are not altogether remunerative. But the ironmakers have the advantage of being large consumers of what they make, whilst they also raise the fuel with which it is smelted. The large foundries are looking rather better, and some fair orders are in hand for pipes and various kinds of heavy castings. In the lighter branches, however, trade is still quiet. Railway wagon builders along the Erewash Valley appear to be doing well, but so much cannot be said about the engine-makers.

In Sheffield complaints are pretty general as to the decline which has taken place in most branches since the commencement of the year. In some extensive works a difficulty is experienced in keeping the hands fairly going, whilst in others short time is the rule. There is a tolerably good make of Bessemer and crucible steel all things considered, but of course considerably below what has been turned out. Not so much Bessemer is going to the rail mills, but a fair tonnage is absorbed in the manufacture of other descriptions of railway material, including wheels, springs, and axles. A fair quantity is also being taken for the manufacture of some qualities of cutlery and tools. There is less doing in heavy cast-steel crucible castings, and this is also the case as regards some of the lighter ones. Not so much is being done in steel-plates for shipbuilders, and in this branch it may be said there is a good deal of competition on the part of foreign makers, who can undersell us even in our own home markets by sending to the ports where they are used. To some extent this could be averted by the railway companies reducing their rates, but this the directors have more than once declined to

do, although they have seen that their policy has driven important industries into other districts. Ordinary iron-plates are not in such request as they were, nor are sheets, but a fair business has ruled as regards hoops. The latest addition to our local industries, that of composite armour-plates, is the one that appears to be in the most flourishing state, for at both the Atlas and Cyclops Works there is marked activity with respect to them, whilst orders and offers are being constantly received from various governments.

These plates absorb a good deal of steel, seeing that of that material there is a thickness of some 6 or 7 in. in some cases. The cutlery houses are by no means busy, and it is only a few of the leading ones that are able to find their men as much as they can do. Comparatively few orders have of late been received from America, and the tariff in all probability has something to do with this. Still, a change for the better is now looked forward to, as there are some cutlery specialties known and appreciated in the States that the tariff will not have much effect upon. This is the case more especially as regards fancy pocket, pen, and gardening knives. In edge tools the trade is dull, and there is not so much doing in sheep shears as might be expected for the time of year. Files and saws are also dull, and so are most of the light branches of the steel trade. At the foundries rather more is doing in pipes, stoves, and grates, but no change has taken place as regards heavy castings for machinery, in which but a moderate business appears to be doing. The malleable ironworks are kept fairly going, and do not appear to have been so much affected as other branches. The leading establishments have several specialties on hand, including lawn-mowers, which hold the highest position in the market, and have borne away several prizes at leading agricultural and horticultural shows.

REPORT FROM LANCASHIRE.

March 6.—The condition of the Coal Trade of this district shows no improvement, the tendency of business being rather in the direction of contraction than of an expansion of requirements, and an indication of the want of confidence entertained with regard to the future is afforded by the fact that sellers are quoting very low figures for long period contracts. Prices still tend downwards, and the reductions which were announced at the commencement of the month by the leading Manchester firms have been followed pretty generally in other districts where concessions had not already been made, the average reductions being about 6d. per ton upon all classes of round coal at the pit mouth. In engine classes of fuel, however, the tendency is rather to stiffen than to follow the downward movement in the Manchester district, as the small quantity of round coal now being screened is causing supplies of slack to be rather scarce, and for some special sorts more money is being got. Both house fire coals and the commoner sorts of round coal for steam and iron making purposes are very bad to sell, and although in most cases pits are not working more than three to four days a week, stocks accumulate in wagons, and coal thus held is in many cases forced upon the market at such low figures that it is difficult to quote any really fixed prices. So far as prices can be quoted, they average about as under:—Best Wigan Arley, 9s. to 9s. 6d.; inferior qualities, 7s. up to 8s.; Pemberton Four-feet, 7s. 6d.; common house-fire coal, 6s.; and steam and forge coal, 5s. 6d. to 6s. per ton at the pit mouth. For engine classes of fuel prices are maintained at about 4s. 6d. to 5s. for bulky; 4s. to 4s. 3d. for best slack, and 3s. to 3s. 6d. per ton for ordinary qualities at the pit mouth.

In the shipping trade there has been only a small weight of business offering in the market during the past week, and stocks are being pushed for sale at very low figures, ordinary Lancashire steam coal being offered for delivery at the High Level, Liverpool, or the Garston Docks at 7s. 3d. to 7s. 6d. per ton.

An important question affecting railway charges for wagon hire has been brought under the notice of the coal trade in this district. The Town Clerk of Blackburn has issued a circular calling attention to the fact that the following clause appears in a bill which is being presented by the London and North-Western Railway Company in the present session of Parliament—"Section 60: In lieu of any other payment, charge, or remuneration which, under the Act (local and personal) 9th and 10th Vic., chap. 204, entitled an Act to Consolidate the London and Birmingham Grand Junction and Manchester and Birmingham Companies, the company are entitled to demand and receive in respect of wagons or carriages provided by them for the conveyance of coal, Cannel, slack, culm, coke, or cinders, when the same are conveyed for any distance not exceeding 50 miles the company may demand or receive any sum not exceeding 6d. per ton; and when the same are conveyed for any distance exceeding 50 miles, but not exceeding 150 miles, the company may demand and receive any sum not exceeding 1s. per ton, and when the same are conveyed for any distance exceeding 150 miles the company may demand and receive any sum not exceeding 1s. 3d. per ton." This circular was brought forward for consideration at the meeting of the South-West Lancashire and Cheshire Coalowners Association on Tuesday, and at a special meeting of the committee of the Manchester Coal Exchange held on Tuesday. The feeling generally expressed was that the passing of such a clause would be detrimental to the interests of the coal trade, and it was decided to take such steps as were in the power of the above associations to oppose the passing of the clause above quoted.

The Iron Trade remains in much the same position as last reported. There is still very little business being done, and prices if anything are easier. Local and district brands of pig-iron average about 46s., less 2*d.* delivered, equal to Manchester and good Lancashire, and North Staffordshire bars are still quoted at about 6*l.* per ton, but North Country bars are to be bought at fully 5*l.* per ton under this figure.

In the engineering trade it is only the leading firms that are being kept well employed, and this is only with keen competition; generally work is running out faster than it is being replaced.

TRADE IN SOUTH WALES.

March 6.—There is no want of business in the Steam Coal Trade at Cardiff, which is only governed by the want of facilities for shipment. The amount sent away last week, however, was the large quantity of 155,574 tons foreign and 23,965 tons coastwise, which leaves merchants but little room for just complaint. No doubt more could be sent away with increased facilities, but the necessary arrangements are not made with that rapidity which merchants require. Prices remain at from 10s. 3d. to 12s. 6d. As regards Newport, trade is not so good, owing to the abundance of coal and consequent weakening of prices. Here, again, the shipment of 33,928 tons foreign and 16,034 tons coastwise shows that merchants who, like most farmers, are always grumbling, have no cause to pull long faces. At Swansea business, which has been dull for a long time, seems about to revive. Last week 23,494 tons foreign and about 11,000 tons coastwise were shipped. The house coal trade is slack at all the ports. The patent fuel trade is not so active as could be wished for. The amount sent away last week from Cardiff was 3197 tons, and 4600 tons from Swansea. The pitwood trade is dull, owing to an abundance of wood, and prices are at their lowest point. Iron was sent away from Cardiff last week to the amount of 2363 tons, and 1106 tons were exported from Newport to East London. Iron ore has been received at Cardiff to the extent of 6942 tons from Bilbao, and 535 tons from other places; Newport received 15,520 tons from Bilbao, and 8201 tons from other places. Prices remain low.

The Tin-Plate Industry, although old orders keep works going, is not so healthy as it might be. Common brands are quoted at 15s. 10d. per box, while good 10 coles fetch only 15s. 3d. or 15s. 6d. Considerable discussion is carried on at Liverpool and elsewhere as to the advisability of increasing the number of steamers sailing direct from Swansea to America and Canada, or, failing that, making arrangements for the American liners now sailing direct from Liverpool calling in the port of Swansea for cargo, the bulk of which would be tin-plates, thus effecting a clear saving of from 3d. to 6d. per box as compared with shipments in Liverpool, the extra railway carriage alone amounting to 6d. per box. This would help to develop the trade still further. The cheaper the article is the more of it is consumed. If the revision of the tariff in America,

which is supposed to take place this year, will include a reduction or abolition of the duty on tin-plates, it would mend matters very much, and that would stimulate consumers to lay in stock, and give trade such an impetus as it has not had for years. It appears that out of six and a quarter million boxes of tin-plates made in the United Kingdom annually, four million boxes are made in the various tinworks situate in West Glamorganshire and Carmarthenshire, and the natural outlet for which undoubtedly is the port of Swansea. The authorities, therefore, should not be slow in acting on this fact.

TRADE OF THE TYNE AND WEAR.

March 6.—There is not much change in the state of the Coal Trade to notice. Best steam coals are in little better request; some large Scandinavian contracts for steam coal has been secured by local houses. The shipment of gas coal has increased a little, and the severe weather which has set in has improved the house coal trade to some extent. The demand for manufacturing kinds influenced by the state of the iron trade continues very quiet. The coke trade continues flat, and this must continue until larger shipments are made for foreign account. The Coupen and North Seaton Coal Company, a well-known company, has been remodelled, and it is now to be called the Coupen Coal Company, with a capital of 400,000*l.*, in 100*l.* shares. Mr. Straker is the largest shareholder, and several other well-known coalowners appear in the list. Mr. G. B. Forster, the well-known mining engineer, is a shareholder, and he is also manager of the works, which are very important and extensive. They have produced for many years a large output of most excellent steam coal, and only recently a seam has been opened, which produces a very fine large house coal, of which a large quantity is sold at Newcastle and in the district. The collieries in the Tyne and Wear are working only moderately all round, full work being the exception at present. The Boldon Coal Company are advertising for tenders for the erection of 50 additional houses for their workmen. This is a comparatively new work near Sunderland, and it has been greatly extended of late. The Low Main and Bensham seams have been found in excellent condition, and a large quantity of first-class gas and other coals are raised daily. The works are destined to take up a position amongst the most extensive coalworks in Durham.

The Iron Trade continues very dull, with little demand for any kind of iron at present, either raw or manufactured. This is owing mainly to the fact that depression is settling down in all branches of trade in the district, especially in the iron shipbuilding trade, and unless a revival takes place in this trade the consumption of iron must gradually decrease. The demand for angles and also for plates and bars has decreased very much. Men are being discharged from shipyards, ironworks, and also collieries and iron ore mines, owing to the blowing out of furnaces now in progress. Shipments of iron have, however, been good during the past few days, and an improved demand is expected from the Continent shortly, and there is also a better account of the state of the iron trade in America. The manufactured iron trade continues very dull. There is no change in prices. No. 3 pig-iron is still 37*s.* What will be the effect produced by the putting out of 18 blast-furnaces remains to be proved. Various opinions are held on the subject, and some who are well informed on the subject hold to the view that no permanent benefit will result. It is true that when this serious course was determined upon pig-iron was down to 35*s.* per ton, but it is also worthy of note that the whole of the iron produced in Cleveland last year—a very large quantity—was sold, and also a little drawn out of stock; that the price realised by the makers was— for No. 3, about 2*l.* per ton over the year; that the makers had reliefs in lower wages and reduced cost of carriage, and thus their position was much better than it was four years ago when the price was considerably lower. There is an improved tone in the iron and steel trades at Barrow and on the West Coast generally, and as the wages of the men have been considerably reduced there it is hoped that this will continue. The iron manufacturers in that district are still agitating for a reduction in the charges made by some of the railway companies for the carriage of coke. On Friday a largely attended meeting of Tyne and Wear shipbuilders and delegates from the men was held at Sunderland (Mr. James Laing presided), and after a lengthened discussion a settlement arrived at, the men agreeing to accept a reduction of 10 per cent. on platers' prices and 7½ per cent. on other classes of labour. These terms are considerably below the reductions previously asked by the masters. The report lately made by the Bolckow and Vaughan Company is considered to be fairly satisfactory under the present conditions of the trade. The bore put down by this company for the salt rock is now within a few feet of the bed, so that it is expected to be proved daily.

The ironmasters in the North of England have given notice to the men that they will claim a reduction of 1*s.* per ton on puddling and 10 per cent. on all other forge and mill wages, to take effect from March 29. Since the award of Dr. Spence Watson was made, which only extended until the end of March, there has been a continued decrease of the price of finished iron, and also a general decrease of orders, hence the notice referred to.

The shipping trade continues in a depressed state, although the freights to some quarters have improved a little. The proposed measure of Mr. Chamberlain, the President of the Board of Trade, has attracted much attention, and it has created a great sensation in commercial circles here. He proposes to introduce a very stringent measure for the regulation of insurances on shipping, and other important alterations. The measure is viewed with the greatest alarm, and it will provoke a very determined opposition from shipowners and all who are engaged in commerce. When the measure is brought forward Mr. C. M. Palmer, M.P. for North Durham, will move a resolution to the effect that it shall be referred to a select committee, with the view of having the proposed provisions, and the premises on which they are founded, sifted and discussed. At the present moment a large number of steamers are laid up in the North-East ports—the Tyne, Wear, Tees, &c., and Hartlepool; the total number laid up is 124, of the estimated gross tonnage of 130,136 tons, and the estimated horse-power of these vessels is 12,936. These vessels are registered, that is, the bulk of them, from North-Eastern ports, but some of them are from Cardiff, Liverpool, Hamburg, and other places. It is, however, pleasing to notice that the number of vessels now laid up is 25 per cent. less than it was a fortnight ago, and we have little doubt that the opening of the Baltic trade will cause the employment of many more vessels, and in the course of a few more weeks the whole of this tonnage will be once more afloat.

At Middlesbrough on Tuesday there was a good attendance on Change, and a better feeling in the iron and steel markets; but little change in the value of raw or finished iron or steel: 16 furnaces have now been put out in the district, and the total number now in blast is 104, as compared with 118 in the corresponding month of last year. The total make of Cleveland pig-iron in February was 149,886 tons, as compared with 159,653 tons in January; decrease 9767 tons. The stocks of iron in the district will soon disappear it is expected, as the shipments continue good for the season, and they are likely to increase rapidly. The chemical trades here have fluctuated to a considerable extent of late; but still the increased prices secured for the leading products some time ago have been fairly maintained. Bleaching powder is sold at 9*l.* 5*s.* per ton, more than double the price that it realised 18 months ago, and other products have also been advanced considerably. One vessel took lately from the Tyne 1200 tons of chemicals.

RAILWAY TURNOUTS.—The character of turnouts differ so widely under different conditions that the young railway engineer is not unfrequently at a loss to determine offhand the method by which he can quickly ensure the best results; but Mr. Clark has shown—“A New System of Laying-out Railway Turnouts instantly by inspection from Tables.” By JACOB M. CLARK. New York: D. Van Nostrand, Murray and Warren-street—that it is practicable for the merest tyro to obtain the necessary data by the use of carefully-tabulated results obtained from carefully-considered formulae, the reliability of which can be tested by anyone accustomed to applied mathematics. Mr. Clark provides for the cases of a turnout from a straight track; of interior and exterior turnouts from a curved

track; of a symmetrical cross-over from straight tracks with equal radii; of an unsymmetrical cross-over from straight tracks with unequal radii; and on a cross-over on a curve. The author truly remarks that the published solutions extant very uniformly regard the turnout track as located on a curve which is tangent to a switched or deflected rail. This multiplies cases requiring for exact determination the construction of diagrams, much calculation, and in general the use of logarithms and circular tables. The tables of frog angles and distances in existence are based on that method, and do not exhibit the corrections sometimes necessary for turnouts from tracks which are sharply curved. Mr. Clark points out that it is generally more convenient to locate the turnout upon a curve which is tangent to the main track at a point not far from the heel of the switch. The head-block is then placed where the departure of the centre lines from each other is equal to the necessary deflection or throw of the switch-bar, which in turnouts form a straight track, should not be less than half nor more than the entire distance from the head-block back to the tangent point, or point of divergence. By this device the exact solutions for all turnouts (except one of rare occurrence) are reduced to the three cases above-mentioned, each of which involves simply the resolution of a right-angled triangle two of whose parts are known, or of an oblique triangle with three given sides; the same remark apply to cross-overs. The tables only occupy a dozen pages, but to the practical railway engineer they will prove invaluable, and save him much of the annoyance and waste of time which he has hitherto had to put up with.

FOREIGN MINING AND METALLURGY.

The Belgian Iron Trade has continued to exhibit a monotonous feebleness. Matters have not changed for the worse during the last few days; but, on the other hand, there has been no improvement. Orders have been received sufficiently freely to give employment to the works from day to day, but it is impossible for them under present circumstances to make a step in advance. Perhaps in view of the reduction which has taken place in the price of combustible the rolling-mills will be enabled to make a slight reduction in their rates for iron, but it appears improbable that they will do so. English pig has made 2*l.* 2*s.* 6*d.* to 2*l.* 3*s.* per ton upon the Belgian markets. No. 1 iron has made about 4*l.* 16*s.* per ton; Nos. 2 and 3 have maintained their respective differences of 6*s.* and 12*s.* per ton. Girders have made 5*l.* to 5*l.* 4*s.* per ton. No. 2 plates have brought 6*l.* 8*s.* per ton; No. 3 have been maintained with some difficulty at 7*l.* 4*s.* per ton; plates of commerce have been quoted at 8*l.* 16*s.* per ton. The imports of iron minerals into Belgium in January amounted to 129,277 tons, as compared with 132,545 tons in January, 1883. The exports of iron minerals from Belgium in January were 20,693 tons, as compared with 36,964 tons in January, 1883. The exports of steel rails from Belgium in January amounted to 220 tons, as compared with 24 tons in January, 1883. The exports of iron rails from Belgium in January were 95 tons, as compared with 1029 tons in January, 1883. The exports of plates from Belgium in January were 2428 tons.

The intelligence received with respect to the Belgian Coal Trade is not very encouraging; in several districts stocks are accumulating, and there has been an excess of production, so that prices have shown a downward tendency. The movement of coal and coke over the Belgian State Railways in the week ending Feb. 24 amounted to 17,459 trucks, as compared with 17,373 trucks in the week ending Feb. 19, 1883. Household coal has continued to make 13*s.* 8*d.* to 14*s.* 6*d.* per ton, but coal for metallurgical purposes has been much depressed, and a reduction in quotations has been generally conceded. The imports of coal into Belgium in January amounted to 98,934 tons, as compared with 95,314 tons in January, 1883. In these totals English coal figured for 21,991 tons and 23,985 tons respectively. The imports of coke into Belgium in January were 4217 tons, as compared with 1514 tons in January, 1883. The exports of coal from Belgium in January were 354,885 tons, as compared with 343,630 tons in January, 1883. In these totals the exports to France figured for 337,628 tons and 323,427 tons respectively. The exports of coke from Belgium in January were 74,764 tons, as compared with 101,598 tons in January, 1883. The German coal trade is in a by no means brilliant state. The exports are large and sustain the markets; but for this quotations would probably be much depreciated. As it is, a reduction of 5*d.* per ton is made in the case of transactions of importance.

The French Iron Trade has remained a prey to depression, and iron has declined at Paris to 6*l.* 8*s.* per ton. Efforts are being made to secure an increase of import duties in France under every possible form. The German iron trade has experienced no improvement, the demand still showing symptoms of weakness. Iron has been neglected, for instance, and pig has also been disposed of with difficulty. The works are only kept going by the current requirements of consumption, and this in an indifferent fashion. A small contract for rails for mines has been let at Parsinghausen. The firm of Collin, of Hanover, has taken 20 tons of ordinary rails at 6*l.* 7*s.* per ton, and 10 tons of small rails at 5*l.* 16*s.* 6*d.* per ton. A syndicate formed in Silesia by the proprietors of rolling mills appears to have been broken up in consequence of disagreements among its members, and more especially in consequence of Rhenish and Westphalian ironworks having offered merchants' iron at 5*l.* 4*s.* to 5*l.* 10*s.* per ton, delivered at Berlin and at Frankfurt-on-the-Oder respectively. Silesian pig has been offered by the makers at three months at 5*l.* 8*s.* per ton, but purchasers make default. The exportation of Silesian pig to Austria has been rendered comparatively unremunerative by the state of the Austrian exchanges. The Council of Administration of the Upper Italy Railway Company has authorised the purchase of 17,700 tons of Bessemer steel and other rails. The Monceau-Bayemont and Chauv-A-Roe Collieries Company has announced a dividend of 1*l.* 1*s.* 8*d.* per share.

THE LAW OF MINES, QUARRIES, AND MINERALS.

The meaning of words, considered according to legal sense and according to common sense, often widely differs, and this is made painfully evident upon reading the opening chapter of the really excellent work bearing the above title—*The Law of Mines, Quarries, and Minerals.* By ROBERT FORSTER MACSWINNEY, M.A. London: W. Maxwell and Son, Bell-yard, Temple Bar—and, were it not remembered that the book is intended for lawyers and not for miners, that chapter would suffice to condemn the whole volume—the definitions are simply comic. It will undoubtedly surprise most miners to learn that “vein and seam” are “convertible expressions;” or that “the word mine is . . . frequently used in a secondary sense of a section of a vein.” Again—“If there are a particular number of veins within or under a piece of land there are precisely the same number of mines occupying precisely the same areas.” So also—“A brick-field or a gravel or ordinary clay-pit is, therefore, in the nature of a quarry rather than a mine.” These extraordinary definitions may probably be traced to the author having followed the too common practice of legal writers of ignoring the existence of distinctly different technical languages in different districts. We know of no district in which “seam” and “vein” convey the same idea to the practical miner in that district, whilst in some districts “mine” is used in the sense of ore or merchantable mineral. In truth, almost every mining district has its own technical language, and, in some instances, the same word has a distinctly different meaning in different districts, just as “dejeuner” and “digiunare,” which are exactly corresponding words in French and Italian, means the one “to breakfast,” and the other “to fast;” or as “concurrence” and “concurrens” mean in English and German respectively “agreement with” and “competition.” But satisfactory definitions are always so extremely difficult to give concisely that failure in this respect of Mr. MacSwinney is quite excusable.

It is but too well known to suitors that when a litigated dispute results in a miscarriage of justice that result can usually be attributed to the fact that the judge, counsel, and witnesses are really conversing with each other without recognising the fact not one of the three parties understands the language or dialect to be more accurate of the other. This is especially apparent when chemical, mechanical, or mining questions are before the courts; and with regard

to mining especially, that legal author would confer an everlasting boon upon the profession, and upon litigants who could secure the recognition and adoption of the principle that the technical dialect of the witness should be even more carefully considered by the judge and jury than the answers given to questions put to him in a technical dialect with which he is not familiar. Witnesses frequently know that they are misleading the court with falsehoods, although they give the true answer to each question in the form it is put, and many of the legal text-books (not excluding Mr. MacSwinney's) are misleading from a similar cause. Thus he says with regard to the word “mine” that “in leases and similar documents it is commonly used in a slightly different sense. There the word includes the stratum of the minerals, as well as the excavation made to win it.” Miners usually talk of winning the minerals (them), and not of winning the stratum, but that is immaterial. Mr. MacSwinney's statement is at once true and absolutely false; it is true as applied to the district in which the dispute in the Midland Railway Company v. Haunchwood arose; but it is absolutely false as applied to many, if not most, other districts, and this is a fact which a writer on the law of mines should point out whether he desires to instruct professional or practical men.

It must not be supposed, however, from these observations that the work is unworthy of praise; on the contrary, it is well arranged, treats of each subject concisely but exhaustively, and displays great research. Mr. MacSwinney has well attained the object indicated in the preface; he has accurately stated the law as it prevails in England, and has recorded many Irish, Scotch, and Colonial decisions, which have come under the notice of Englishmen by appeals to the House of Lords. The index is admirable, and the manner in which the references to all the reports are given in the Table of Cases adds materially to the value of the book as a work of reference. The information given is brought down to the date of publication, and it is evident that no pains have been spared to make the volume complete, easy of reference, and thoroughly reliable.

I METALLI—LORO MINERALI E MINIERE.

The importance of technical and natural science education for securing the commercial and industrial progress of communities is now recognised everywhere, whilst the social intercourse at present kept up regardless of nationality or language throughout the republic of science and literature gives everyone the benefit of the latest and most important researches in connection with any given subject or science, no matter in what part of the world they may be made. Until the unification of Italy by il Re Galantuomo it must be acknowledged that that country had in all that was likely to conduce to material progress drifted far behind other European nations, but the development which has resulted from the enlightened policy which has prevailed during the reigns of Victor Emanuele and Umberto has demonstrated that good government alone was necessary to bring out the latent energy of the people. In the Italian Universities, the ancient fame of which had been almost forgotten, a revival has taken place in the teaching and study of technical subject, which augurs well for the future, and which cannot fail to have a satisfactory influence upon the development of the enormous mineral resources which Italy possesses. In Prof. d'Achiardi's instructive and useful volumes—I Metalli, loro Minerali e Miniere, di ANTONIO D'ACHIARDI, Professore di Mineralogia nella R. Università di Pisa. Milano: Ulrico Hoepli—the Italian mining student is provided with a work which will give him a very complete *résumé* of the state of knowledge with regard to mines and minerals throughout the world.

The arrangement of Prof. d'Achiardi's work is at once systematic and practical. The several metals are carefully grouped so that those possessing similar characteristics can be studied consecutively, and with regard to each metal the author divides the minerals yielding it according to the mode in which the metal occurs. His method will be best understood by referring to one of the metals—silver. Here he deals first with silver ores, then with argentiferous minerals, in which class he includes such as galena, blende, and so on; and he mentions with regard to the latter that, although for a long time no account was taken of the silver contained, it is now recognised that it often contains it in no less quantity than galena does (Per lungo tempo non se ne fece alcun caso; oggi per altro non solo si ricerca per l'estrazione dello zinco, ma pur anche per cavarne l'argento, che vi si contiene spesso in quantità non minori che nella galena), and this reminder is worth reprinting, because although miners obtain a better price for their blende than formerly it is considered that they do not always receive the full value which the silver contents should secure them. Silver ores and argentiferous minerals having been disposed of there is a section on the silver mines of various districts and countries, and this is followed by a general recapitulation and conclusions to be drawn from the information given. Each metal receives similar treatment, so that all necessary instruction can be readily obtained from the volumes, the reading of which can leave no doubt that the Professor is an able and agreeable teacher, and that he gives his pupils the full benefit of his extensive knowledge and research.

THE RAILWAY COMPANIES DIRECTORY.—The labour involved in the preparation of such a volume as that just issued by Mr. PERCY LINDLEY, of Fleet-street, by whom it is compiled, must have been enormous, yet having relied entirely upon official sources for his information he has succeeded in bringing together a mass of facts calculated to prove of the utmost possible utility to all connected with railways, whether as officials or shareholders. The volume gives the directors, officers, and chief agents of the United Kingdom, together with the capital authorised, created, and subscribed, whether stock and share, loans, or debenture stock; the capital expenditure and receipts; available borrowing powers; revenue—expenditure and receipts, dividends, mileage authorised and constructed, and so on. The first section is preceded by a summary, alphabetically arranged in tabular form, and in the order of the companies of the principal railway shares and stocks, prices and dividends, which is very easy to refer to, whilst in subsequent portion of the volume there are the various details connected with the management and finance of each undertaking; a list of the whole of the English, Irish, and Scotch directors and officers arranged alphabetically under the respective heads of directors, secretaries, general managers, engineers, &c., with their addresses and the railways to which they belong; and, lastly, reference to the leading manufacturers of railway plant of every description. The work is well worthy of support, and will doubtless become—it is intended to issue an edition each half-year, so that the analyses of the accounts may be complete—a standard book of reference.

THE MINES ROYALTY TAXATION MOVEMENT.—Fresh efforts are being put forth to give impetus to the proposal to tax mineral royalties and ground rents. Mr. D. E. Williams, J.P., Hirwain, has just been in communication with several prominent public men on the subject. Mr. Forster, M.P., has promised to give the matter his best attention should it come before Parliament. Sir Baldwin Leighton, Bart., M.P., remarks:—“I am much obliged for your letter on local taxation and the rating of royalties and ground rents. But the matter, though important, is rather complicated. I understand the present law to be that the royalties and the ground rents are rated only. It is the tenant who pays on them; and that the lessor or ground landlord might turn round and say, why should not the lessee be rated on his trade profits, to which he is assessed under schedule D of the income-tax? Thus, if a mineral property were assessed at 1000*l.* for royalties and dead rent the lessee would pay on that, and also I think on some of the machinery or houses above ground besides; but he might be making 6000*l.* a-year and be paying income tax on the amount under schedule D, and yet not be paying anything to the local rates on that amount. How is this? I shall be happy in my motion to refer to the question if I can see my way to it.” Mr. Broadhurst, M.P., expresses ready acquiescence in the movement; so does Mr. H. Richard, M.P., in effect. Sir John Jones Jenkins, M.P., says:—“I am quite at one with you as to the desirability of rating royalties and ground rents. If you can furnish

ing with some additional particulars I will give the matter my best consideration, with a view to attain that end." Mr. Chamberlain, M.P., withholds any statement of opinion.

AMERICAN MACHINERY FOR BRITISH COMPANIES.—Mr. Fred. Morris, M.E., San Francisco, writes:—With regard to sending American machinery to foreign mines, and notably to the Transvaal mines, worked by British companies, permit me to state that as I lately returned from England, and have devoted most of my time to mining machinery, I have had several parties here questioning me as regards quartz mill machinery. If in England they have none of the new patterns for quartz mills I of course know for a positive fact that such works as the Sandycroft Ironworks had all the latest improved quartz mill machinery. The price is 25 per cent. less than what the same machinery can be had here. Now does it not appear that there is something wrong when you have to add to the cost price the freight from here to steamer, then by rail across the Isthmus of Panama to Colon (as that is the only way possible that the machinery could reach Africa by April)? The freight from here to Colon is 3 cents. per pound, or as much as the cost price of the castings would be in England. I am not opposed to see a reasonable price paid, but I am decidedly opposed to jobs or rings of any kind.

Meetings of Public Companies.

THE MONTANA COMPANY.

The first annual meeting of shareholders was held at the Cannon-street Hotel on Feb. 29.

Mr. N. STORY MASKELYNE M.P., in the chair.

Mr. JAMES JOHNSTON (the secretary) read the notice convening the meeting.

The CHAIRMAN said that he was glad to see so many of the shareholders take so real an interest in the proceedings of the Montana Company, and he hoped before they went that they would feel that they had discharged the duty entrusted to them a year ago. In proposing that the report and accounts be received and adopted he might perhaps say that in coming there to-day two of his friends informed him that whatever the Chairman may say to a collection of shareholders they would largely discount. Last May, they ventured upon certain data that they had in their hands as regards the mine, and they had been singularly near the truth. It was out down, and out down, and the result of all that cutting down was to tell them that they thought the average value of the ore would run to something like \$40 to the ton. He believed still that will be found in the end to be the average of the ore that they ought to work. Last year he told them that he believed the ore to be large, rich, and very deep. Then there were some anticipations he held out to them, and some hopes, which, however, were not realized. He certainly was then led to believe that they were on the eve of having all the capital they needed placed in their hands; and without going back to the past, or wearying them with the details, he might say that for several months promises had been held out and assurances given from quarters on which he thought they could rely—they were all disappointing. They did not get what they expected, and soon after entering upon the undertaking they found the money market as it were a bar to them, and in September they were in very narrow straits indeed. However, the body of gentlemen who sold the mine to the Joint Stock Association, whom he could not consider entirely blameless for the anxiety they had during six months—came to his rescue, and with their aid in October they were able to raise 40,000 shares taken up at par for the company. With the 40,000, they believed they were in a position to move. They had long been carefully considering in what manner they could best get to work in the mine. They had already secured a great quantity of the machinery, and that machinery they were now able to complete the payment for. They ordered at the time 20 stamps of a very large and superior description, and that machinery was all in full work, and answering extremely well. Mr. Attwood expressed himself as entirely satisfied with it, and they were having fitted up as fast as the most terrible weather will permit, 20 of the largest stamps ever put up in America, which will dress 2 tons per stamp per day. That was the position at the end of the year. During the year he had many communications with Mr. Attwood and Mr. Cruse. It struck him that Mr. Cruse's share in this mine was so large that he would be the best man to help them. They applied to Mr. Cruse as there was some difficulty about the cost of the 50 stamps; that, however, was settled. They had now arranged with Mr. Cruse who had advanced 30,000, for completing the work at the mine. With the 40,000, and with the 30,000, from Mr. Cruse, and with the balance of working capital which has now been raised, he thought they had ample means to do all they had promised. They had ample means to at once put in hand the completion of 50 stamps immediately; and although it was out of one's power to say exactly how long it would take to make and put up such machinery in a country like Montana, he thought before September came they would have the great mine being worked at its full capacity—at least, as full a capacity as 50 of the largest stamps in America could make of it. He hoped they would feel that it is not the fault of the directors if this business has not been done before. He hoped they would feel that the difficulties of capital were their difficulties. They had now got the money and are in a position to look the future quite calmly in the face, and he ventured to think before they met again they would at any rate show that the promise of this great Montana Mine had been achieved. As to the assurance he gave a year ago that they would go to the Stock Exchange as soon as might be for a settlement and quotation, he was assured when they came into the room that the capital had been raised, and that they were going to the Stock Exchange and ask for a quotation until they had raised the whole of their capital. Raising the whole of our capital is a very simple matter, but he thought it would be advisable in the interests of the company that we should not be in a great hurry to put 15,000 shares upon the market until there is a little more need for them. If they wished it to be placed it should be placed, but if you think it would be better to leave it unplaced for a little while it shall be so. That is all he had to say about the position of the company at the present moment. If their 20 stamps were now put up, and if they gave them 40 tons of ore per day, the profit they ought to get put at nearly 5s.; or, if they liked, 4s. You will see then that that would pay a very respectable little dividend. On the other hand, of course, as soon as their additional 30 stamps are up their dividends will be more than doubled. He did not think that he need turn that into percentages, but with whatever profit they might make he would ask them to allow them to retain a certain proportion of that money for extending their stamps, because although 50 stamps give them 100 tons a day—that is to say, between 4000 and 5000 a day profit—he was going to limit his aspirations to these 50 stamps, but shall be immediately looking about for money to put up more stamps, and thus make more and more of their mine. As to the development of the mine, he need not go over the position they occupy in Montana. They had from Mr. Cruse five old stamps. Their manager, Mr. Attwood, is a man of a great deal of resource, and he is not going to have five old stamps, so that they would be of no use; but by improving the old stamps, and buying the other stamps, I think it practically has become a mill of 10 new stamps. He has converted Mr. Cruse's old stamps, together with the five new ones, into 10 new stamps, with which he is doing good work; and they would hear more of the results of the mine now they have got into working order, and he had no doubt, within the next two or three months, they will be contributing to the return of the mine. A word about the machinery. He told them early in the autumn they started, having a quantity of machinery supplied to them from some works at San Francisco. They required machinery of a peculiar type. They had some rather unobtainable photographs here, which would give an idea of the character of the machinery; but he thought it would require people of experience and of some imagination to quite understand what it is. However, he might explain it in this way—the diffusion of energy all over the mine, although a comparatively new and admirable affair, by compressed air. In a climate like Montana it is very important to have the means of conveying power without being checked by the weather. Compressed air did that, and it had a chance of ventilating wherever it went, and they were saved the expense and trouble of ventilating the mine. Consequently, that sort of machinery was to be adopted in all the workings. (Hear, hear.) That was a comparatively new thing. He gave Mr. Attwood great credit for the manner in which he had done his work. He had not worked one of these things before, but he heard of them and knew of them, and he, with a master's eye, determined that that should be the mode of conveying the power, and he had had it put up, and it was now working, and working with admirable effect. The cost was a good deal, but in the long run it would be found to be the most economical thing they could have done in going to the expense of putting up this air-compressor. Having established a position for the new 50-stamp mill at the mouth of the tunnel that they had been driving, it became very important to have the means of bringing down the ore from Cruse's old workings to the mill, in anticipation of the day when they should have succeeded in reaching the lode with the tunnel, and having sunk a shaft down to meet that tunnel, and that, of course, would be some months in the future; and therefore it was very necessary on that and on other accounts to have a direct communication between Cruse's old tunnel and the workings at the new mill, and the consequence was they were constructing a tramway. There was a good deal of cutting and work to be done to do it perfectly. It was at a high incline of inclination; but they had constructed a tramway for bringing down the ore directly from Cruse's workings to the mill, and that was now finished, and working in a very successful manner. That also was worked by means of compressed air machinery. The next thing he would allude to was the tunnel. Winze No. 1 was 72 ft. below Cruse's Tunnel, which was 133 ft. from the top, and they found the lode going out in this direction, so they would have to drive somewhat further than was anticipated, but in about a fortnight they would probably strike it. It was a large, low level tunnel that he was going to speak about. He might doubt the wisdom of it, a good many people had. His own belief was they had spent the comparatively small sum of money the tunnel should have cost us—that was 3000, or 7000, out of 100,000, capital—he thought they had spent it well. If they struck this lode at 40 feet from the surface, which would practically double the value of our mine, that was worth doing. On other grounds it was most desirable that they should

place the mill on the most natural mill site which occurred in this locality. He might say that his colleague and friend, Lord Castle-town, one of the directors, was out at the mine in the summer, and no doubt would give him impression of the work which was being done and the general aspect of the place. When they first acquired this property they acquired not very much; they got the mine, which was an important thing, and they got certain bits of ground, and so the old mill site was, and between this old ground on which they were putting the mill and the ground on which the Maskeleyne tunnel runs they struck a little lode not entering the tunnel. Mr. Attwood very sagaciously at once proceeded to obtain a patent right for it. That patent right in America was very important, because it gave us a patent right to that portion of the property. Besides those bits of property that were acquired with the mine, they acquired very small water rights. Their water rights were far too limited for the purpose of the mine, and Mr. Attwood had done nothing more sagacious than the way in which he had acquired water rights very largely. He had his hands upon sufficient water for the present, and he believed and hoped for future purposes, and he thought he deserved great credit for doing what he had done in this way. During the year it was perhaps natural that many of the shareholders should find ground for complaining, and so sometimes they had been told they were too reticent, sometimes they were told they were too slow, and so on. As to reticence, they had told them all. Anybody who read the reports seriously, would see that they had published them with considerable care, and not with the intention of overcharging the report with anything which is not true. So long as he was there they would have nothing in the way of a report or information which was not strictly the truth. As to his colleagues—the Chairman who had not the confidence of his colleagues and had no confidence in them, held a position which was entirely a false one. But he really felt he could hardly express the manner in which his colleagues had worked, but especially those of his colleagues who had worked with him all through the last year, to be five who had taken upon the board the time they took the concern. Recently they had taken two more gentlemen from the Joint-Stock Association, and he was much obliged to them for their co-operation also. He felt they had nothing to ask but their confidence a little longer, and this Montana Mine would hold before the whole world the position which it had already begun to assume in the imaginations of men in America and on this side of the water who knew anything about it. The croakers had said they could never strike the lode in the great tunnel. He had always laughed at them, and he believed that in an indication that we are approaching the great lode itself. The CHAIRMAN, in reply to Mr. GLOUS, said that he had not said anything about the quality of the ore that had been worked, but he might say the ore that had been worked had been entirely and exclusively from the winze they were sinking to meet the shaft. That winze was being sunk in a rich streak of ore. In every lode they expected certain portions of the lode were much richer than the others, and they were sinking this winze in the richest place. Therefore, they were working not average ore but in a particular streak of ore. When they had the lode to sink to sink a lode in the place where they had sunk it, and Mr. Attwood thought it was bringing grit to the mill to sink the shaft where there would have to remain, and he sunk it in another place. 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either a call of one penny or a farthing should be made upon the shares for the sake of making them capable of subdivision, or (what was considered more convenient) the fractional amount of 2½d. should be returned to the shareholders to make them subdivisible by three. It is a pure arithmetical arrangement. That you will find is a later resolution which will be proposed to you presently. The second resolution will be for the subdivision of shares, and the third is for the return of the 2½d. per share to render them susceptible of such division. This process must take place before a subsequent arrangement can be made, and that then requires confirmation at a subsequent meeting in order to make the resolutions binding before the subsequent resolutions are proposed to you, which will be the subject of resolutions at a later date. But I may mention that the whole object of the three resolutions is what I have now mentioned, and is the subdivision of each 207. share into three shares of 107. each, and the return of that small fractional amount of 2½d. in order to render them susceptible of subdivision. The shares will be liable to a call of only 2s. 6d. per share. The present shares are liable to a call of 7s. 8½d. The return of the 2½d. per share will bring it to a figure that we can carry out the subdivision. The other resolutions are merely matters of course. There is just one other point to which you have just alluded, and I will respectfully suggest as you have just referred to a shareholder's complaint of being transferred by deed according to our English law, that there is a good deal of difficulty. It may be done by the issue of what are called share warrants; but share warrants bear three times the stamp duty which shares do. They have never been popular in England. I know the case of three companies, and three only, in which share warrants exist. One is the Nouveau Monde Mining Company, a foreign company constituted in France, where they are legal without the necessity of complying with English law. I know further the Pontgibaud Company, which is a foreign company with an English constitution; the third is the Rio Tinto Company, where a very large number of shares are held abroad, and where it was almost essential, the company being founded on an old Spanish company, that that form should be adopted. Some time ago, when I had occasion to speak to the secretary of the Stock Exchange on this subject in connection with another company, he said, speaking in general terms—"We do not know on the Stock Exchange what a share warrant is;" and he added—"I, for one, have never seen such a thing," and I think that was an old company like this, where certainly it is a condition of very considerable, and I venture to say of hopeful, prosperity. (Hear, hear.) It would not be advisable to permit its constitution by introducing what is clearly an anomaly, an almost unknown anomaly, in English law, which would also require an alteration in this important particular of the Articles of Association under which share warrants cannot be issued by law; and in addition would require that the share warrants should be paid up in full, because without that no share warrants could possibly be issued. It seems to me, according to the best judgment I can form, that it was not possible for the directors prudently and judiciously to comply with the request which has been made, and I hope this explanation will be considered sufficient. Of course the matter is not by any degree closed by having it passed to-day, because at a future meeting the question is susceptible of being raised should it be considered desirable to do so, or any better judgment than mine laid before the directors. At present it is quite clear it would not be either desirable or prudent to introduce at the present moment the alteration which has been suggested. I think I have made the matter sufficiently clear to enable you to pass the several resolutions which will be submitted to you successively. (Hear, hear.)

MR. ANWYLE: Have you taken into consideration any plan by which the shares could be fully paid-up?—THE CHAIRMAN: By paying them up. (A laugh.) You can do it by making a call.

MR. ANWYLE: Have you taken consideration whether it could be made?—THE CHAIRMAN: It had been carefully considered by the directors, but hitherto it had always been felt that the case of a Limited Liability Company, as this company happened to be, rendered it impossible for the company if there was some small fractional amount to call. (Hear, hear.) Even if the small amount of 2s. 6d. per share were called it would have to be set aside as a reserve fund, for the purpose of preserving the credit of the company. He thought that the shareholders would consider that the directors had exercised a sound discretion in that respect.

The first resolution was then put, and carried unanimously.

THE CHAIRMAN moved the second resolution, as follows:—"That the Articles of Association of the company be altered by the addition thereto of the following regulation (to be called Article 6A): The company may subdivide shares in the manner and with the incidents prescribed or allowed by the Companies Act, 1857, and may modify the conditions contained in the Memorandum of Association accordingly."—MR. G. HEIBON seconded the motion, which was unanimously agreed to.

THE CHAIRMAN then moved the third resolution:—"That out of the accumulated undivided profits of the company the sum of 2½d. per share be returned to the shareholders holding shares of 207. each, viz. 2½d. 12s. 8½d. paid up thereon, in reduction of the amount paid up on the said shares respectively, and that the amount unpaid on each share be accordingly increased by the like amount of 2½d. per share."—MR. GOLDMID seconded the resolution, which was carried.

THE CHAIRMAN: Gentlemen, you will be sorry to hear that our great friend and able honorary consulting engineer, Mr. Furber, is dead. We have lost a most valuable man to him. He has been connected with this company for the last 30 years. He has been our chief engineer out there, and when he came back to this country he became one of our directors, and whilst his health permitted he remained with us, and always gave us the benefit of his sound advice and great experience, and in him we have lost a most able instructor. (Hear, hear.) I think he was about the only man in London who has been in the habit of mining for many years in Mexico. I am sure all the proprietors will hear of his death with a great deal of regret.

MR. WILLIAM ABBOTT: Mr. Chairman and gentlemen, I am sure you will echo the feelings of the shareholders generally in the regret which you have expressed in the loss of Mr. Furber. (Hear, hear.) I should say that what the company is called upon to do to-day—to provide for the subdivision of the shares, thus making a new start in its career, could not have been possible had it not been for the extraordinary zeal and attention which Mr. Furber for many years past has displayed in the development of this property. (Hear, hear.) It will be satisfactory to the shareholders to know that in succession to Mr. Furber you have a very valuable officer in Mr. Hay. I do not think that shareholders generally appreciate really good service. They are rather in the habit of taking things as a matter of course, and when success comes it is looked upon as good luck. In this case it is not so. I know from the fact that Mr. Hay is a man of great energy, and I have lately had from the partner of one of the largest shareholders in the company the words you have in Mr. Hay a most able, thoroughly upright, and straightforward intelligent officer. (Hear, hear.) Although this is a formal meeting yet, Sir, as we shall not have the pleasure of meeting you till May next, I think it is right we should take the opportunity of interviewing you and getting all the information we can from you in the official position you occupy as Chairman. I think, Sir, you must judge of the interest of the shareholders in their affairs by the large attendance which has gathered here to-day, and I think it is quite unusual where the approval of mere dry legal formalities is to be carried out such as the dividing of the shares. As I think I am responsible for the movement which led to this division, I trust I may occupy the time of the meeting in saying a few words. (Hear, hear.) It does seem strange at the present moment, when this company is merging from the obscurity I may say of 50 years ago, that such a considerable interest should be awakened in its welfare. The shareholders no doubt have received a large number of circulars, all of a depreciatory character. Still my name is not in any of them, and I can safely say, as I am pretty well known in the City of London, that I never am afraid to put my name to anything I advocate. (Cheers.) One gentleman tried to give a stab in the back by hiding under an anonymous signature, and I think the best way is for shareholders to treat such advisers with contempt. (Cheers.) If the gentleman has the courage of his opinion I hope he is in this room, and will address the meeting, and then no doubt the Chairman will give him the information he desires.

A SHAREHOLDER: He is an "ex-shareholder."

MR. WILLIAM ABBOTT: There are several of them. (A laugh.) The object of these circulars is perfectly clear. There was a considerable amount of jealousy evinced in certain quarters at your property. The shareholders of this company have waited very long for that property, and very patiently too, but I believe you will not have to wait much longer. There is this singular fact that notwithstanding these attacks upon your property—and here comes the crucial test—the number of the shareholders have increased in three months by 25 per cent. Where does the largest amount of this increase come from? I know, because I have watched the share-register, and I find it comes from the friends of those rich German firms in Bremen, who are the largest purchasers of your ores. Just allow that to sink into your mind. I have been lately in correspondence with those gentlemen, and also had the pleasure of an interview with the partners of one of the most influential firms who are large shareholders, who went to Mexico, and have recently been to Bremen, and he assured me that in the United Mexican Mine you have a property of extraordinary value. (Cheers.) I speak before you, Sir, and I am liable to correction, but I believe you have the pleasure of meeting the same gentleman, and I should be glad if you will assure the shareholders by endorsing the opinion to which I have given expression. With regard to the remark of our worthy solicitor regarding shares payable to bearer, of course there are difficulties, but they will be removed when the shares are divided into shares of 107. each, because you can make a call of 2s. 6d. per share. I do not believe the necessities of the company require a call, but I think it would be a satisfaction to many of the shareholders to pay up 2s. 6d. on the 107. share, and get rid of the liability. (Hear, hear.) Many wish to interest foreign friends in this company, and I hope you will not withhold the information which the present difficulty, to issue shares to bearer, and thus satisfy other persons who desire to take an interest in the undertaking. (Hear, hear.) There are other important companies, the Imperial Ottoman Bank and the Tramway Company of Germany, where the shareholders pay the extra tax willingly, in order that the shares may be placed in a form that they understand on the continent.

A SHAREHOLDER: Also the Bordeaux Tramway.

MR. WILLIAM ABBOTT: And also the Bordeaux Tramways. While replying to this remark I must be glad to give you some information. I am sure you are in a state of great impatience as I have heard. The last time I saw you you informed me that from the cash received from time to time you had a large amount of money in hand. It is perfectly clear if you have cash in hand it must be surplus from the working in Mexico; therefore we may assume that what cash you have in London is the surplus profit; therefore, from the advice which comes to hand, it is more than probable that that surplus is daily on the increase. I think at this meeting of a large number of shareholders it is only fair that you should give some information on that point, and not allow this meeting to disperse merely accepting the resolutions placed before them. (Cheers.) I must take exception to the cold circular you sent with respect to the resolutions to be proposed. There was not a word from the secretary. It was the coldest and most meaningless circular ever issued. (A laugh.) It did not say why change was desirable, or whether it was a requisition from a number of shareholders; but there as it was—take it or leave it—(a laugh)—and I know a very large number of shareholders were dissatisfied. (Hear, hear.) But I hope we can make a new start, and that more life will be infused into the company, and that in the interval, which will elapse between now and the regular meeting you will fill up the vacancy or vacancies on the board, by the appointment of gentlemen of known experience and energy; because the management of this company will now, I am sure, require a greater

amount of attention than ever before. (Cheers.) Pray understand with regard to this remark it is true we should pay a proper tribute of respect to your worthy self. You have stuck to this company I am afraid to say how many years, more than 20 years, and have regarded it as a child of your own, and are to be congratulated on the change which has taken place in its prospects. (Hear, hear.) Now, Mr. Chairman, I hope you will order a full report of this meeting to be circulated amongst the shareholders. I believe there are nearly 600 shareholders, and it will be satisfactory to absent partners to know what has been done in their interest. (Cheers.)

THE CHAIRMAN: I may remark, Mr. Abbott, that no discourtesy was intended by our worthy secretary—hear, hear—but that his desire was simply to issue a business circular; otherwise, he would no doubt have put it differently. With respect to the many questions you have asked me, I have simply to say this is only a meeting for a special purpose, and that inasmuch as the whole of the despatches are always given to the public, and are now placed upon the table, it would be futile for me to go into the thing at length. I may mention to the meeting that we have to-day—it is wonderful that it should come on this very day—we have had from Mr. Rocha a report, which will be placed on the table, and which, in fact, we have here, and which shall be read to the meeting. It is of the most favourable description. (Cheers.) I must confess that Mr. Abbott has called upon us to go into matters which really require a half-yearly meeting to discuss. The board can simply say that everything is going on in a satisfactory way. I may mention that we had several telegrams of a very disappointing description as regards the excess of the returns over cost. But we have explanations each mail with regard to that. The first telegram was \$2300 over the \$5000, the second \$700, and the third a very disappointing one of \$1000 only; but inasmuch as we have now his despatches before us, the reason had charged the gear which we had sent to him against that week, and the consequence was there was \$5000 spent and charged to revenue for the hoisting crabs and gear. (Hear, hear.) In fact, it was one of the best weeks we have had. We look forward to the next return with equal satisfaction, as Mr. Rocha tells us in his report that everything is going on satisfactorily, and that the railway is now completed and the rails are down. It is better, perhaps, that Mr. Brown should read his report.

MR. W. J. LAVINGTON: Kindly tell us what cash you have in hand.

THE CHAIRMAN: Between 14,000 and 15,000, in London.

A SHAREHOLDER: And liabilities?—THE CHAIRMAN: Nil. Not a shilling. (Cheers.)

MR. HORNCASTLE said he believed that in November last there was a floating debt of about 11,000. THE CHAIRMAN said this consisted of the very shares it was now proposed to convert, which they called the "old gentlemen," or the old shares which were not converted 20 years ago.

MR. WILLIAM ABBOTT: Then I think it is more proper. That imaginary liability is merely the calls upon those shares which people have not come to claim. You have sent out notice that if they do not pay up the shares can be sold, and the proceeds credited to capital account, and that will be available as capital.

THE SOLICITOR: And not only that, but the old shares are liable to rather a larger amount of calls than the dividends to which they were entitled.

MR. W. J. LAVINGTON: I gave a short history of the company, and some of the difficulties which the board had had to contend with. He pointed out that many years ago the old mine became less productive, and Mr. Furber purchased an adjoining property, which was the property from which they now expected to make their large profits. At the same time the old property, although not so productive as formerly, had been very useful in furnishing means to open up a new mine. He thought very great credit was due to Mr. Furber for the foresight he had displayed in this matter. (Hear, hear.) He said that the great regret which he had at this time was that the shareholders, after waiting patiently so many years, would get tired of paying more calls, and allow the company to be wound up, and thus permit what was undoubtedly the finest mining property in Mexico to fall into the hands of other persons, who would benefit from all the labour and money which had been spent on the property, and reap the reward for which others had worked so hard. He congratulated the shareholders on having stuck to the property for so many years, and expressed the hope that they were now about to reap a rich reward for their patience. (Cheers.)

MR. BROWNE then read the report, received that morning, as follows:—MR. MORRISON said he was sure the shareholders would join in giving a vote of thanks to the Chairman for his courtesy in the chair. He expressed his great regret at the death of Mr. Furber, and said he was sure it would be gratifying to that gentleman's relatives to hear the deep appreciation of his relatives of his character and services. (Hear, hear.) He mentioned that he had received private letters giving most satisfactory information regarding the prospects of the mine, and mentioning that there was now no doubt whatever that they had now got the celebrated La Luz lode. (Cheers.)

MR. WILLIAM ABBOTT seconded the motion, which was carried, and the meeting broke up.

SOUTH CARADON MINE.

A general meeting of shareholders was held at the offices of the company, Dashwood House, on Wednesday, for the purpose of receiving a report as to the progress of the mine since last meeting.

MR. CHILDS in the chair.

MR. W. J. LAVINGTON, (the secretary) read the notice calling the meeting.

THE CHAIRMAN said this was not a general meeting, but the directors had thought it desirable that the shareholders should have the opportunity of knowing what had taken place. Capt. George was present, and his report would be read. The directors had also obtained a report from an independent agent, Capt. Hodge, who had within the last week inspected the mine and works, and his report would also be read.

MR. LAVINGTON then read the reports of Capt. George and Capt. Hodge as follows:—

MARCH 3.—I herewith beg to hand you report, in which I purpose showing the progress made since your last general meeting in driving the different levels, and laying open ground for future development, together with the present prospects of the mine.—Rule's Shaft: The proposed alterations of the pitwork in this and the new shafts have been completed, and found to answer as expected. The consumption of coals, and other expenses in keeping the water from the eastern part of the mine are thereby considerably reduced.—Holman's Lode: The 210 has been driven cross-course, but the lode here has varied from 1 to 4 ft. wide of a very promising character throughout, and yielding at times from 1 to 1½ ton of ore per fathom. In the present end it is 2 ft. wide, composed of capels, copper, and muddle intermixed with such indications as lead to expect an early improvement. We have recently put a pair of men to drive on a side branch at the 180, east from this shaft, which is now yielding saving work and we think will improve as the driftage is extended.—Kittow's Shaft: The pitwork here has been taken up, it being no longer required for pumping, and the mine is now being worked on the 180 level, which is being raised, and will be refilled as fast as the nature of the work and the weather will admit. The 180 has been driven east 24 fms., the lode varying from 1 ft. to 2½ ft. wide, and yielding in places from 1 to 2 tons of ore per fathom. In the present end it is rather disordered, but producing good stones of ore, and judging from its character, and the dip of the ore ground over, an early improvement may be fairly expected. Since hoisting the winze from bottoms below the 160 to the 180 we have started a 170, which has been driven 16 fms. 4 ft. The lode has varied from 1 to 2 ft. wide, the latter being its present value. A trial winze has been sunk below the 180 about 22 fms. in advance of this (170) end. In this winze (which is nearly low enough to communicate when the end has been driven home) we have had a good and speedy lode, the present bottom being worth 2½ tons of ore per fathom. The 160 has been driven east 47 fms., lode proving productive throughout, being from 1 to 2½ ft. wide, yielding 1½ to 3½ tons of ore per fathom, with a strong capel, having good branches of ore running through it. The present end will yield 3 tons of ore per fathom, and being considerably in advance of either of the other ends on this lode speaks well for the future of this section of ground above and below. Two stopes are being worked in the back of this level yielding 2½ and 3 tons of ore per fathom.

The 150 has been driven east 17 fms.; the lode for some fathoms has been small and the ground hard, but recently an improvement has taken place, the lode now yielding 1½ ton of ore per fathom with ground more favourable for driving, and seeing the long run of ore beyond this in the level below we confidently expect a further improvement here. About 6½ fms. behind the present end a cross-cut has been put out north to prove a portion of the lode thought to be in that direction, and a branch about 10 in. wide was intersected containing a little copper ore, but not to value. Beyond this the ground having become much harder it was thought advisable to discontinue it. In the 140 after driving a short cross-cut the main part of the lode was intersected, on which we have since driven 15 fms. 4 ft. 6 in., yielding for the first 5 fms. from 1 to 2 tons of ore per fathom, where it became a little disordered by a small cross-course, but has since resumed its former value, and in the face of the present end a trial winze has been sunk below the 140 about 22 fms. in advance of this (170) end. In this winze (which is nearly low enough to communicate when the end has been driven home) we have had a good and speedy lode, the present bottom being worth 2½ tons of ore per fathom. The 160 has been driven east 47 fms., lode proving productive throughout, being from 1 to 2½ ft. wide, yielding 1½ to 3½ tons of ore per fathom, with a strong capel, having good branches of ore running through it. The present end will yield 3 tons of ore per fathom, and being considerably in advance of either of the other ends on this lode speaks well for the future of this section of ground above and below. Two stopes are being worked in the back of this level yielding 2½ and 3 tons of ore per fathom.

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on a lode from 1 to 4 ft. wide, producing in places good pockets of ore that will be taken away at a high tribute. Although the lode holds out good promise, and producing occasional good squalls of ore, yet it has not up to this time yielded so well as one might be led to expect. The 180 east has been extended about 18 fathoms in a lode from 1 to 2½ ft. wide, yielding in places from 1 to 2 tons of ore per fathom. Tribute ground in this end is approaching the runs of ore gone down in the levels above, and from the appearance of the vein and the surrounding rock an early improvement may be expected. The 170 east has been driven (say) 17 fathoms in a lode worth fully 2 tons per fathom. A winze has been sunk in the bottom of the 160 (say) 20 fathoms in advance of said end; down (say) 9 fathoms, which have been fairly productive the whole distance; present bottom worth fully 3 tons per fathom. So you have good ground for hope to open up a valuable piece of ground in this direction. The 180 east has been driven about 47 fathoms in a lode producing from 1 to 4 tons per fathom; present end up to the average, a good ore lode. The 150 east has been driven (say) 17 fathoms in a lode worth from 1 to 2½ tons of ore per fathom; present end opening out profitable ground. The 140 east has been driven (say) 16 fathoms through a lode worth from 1 to 2 tons of ore per fathom; present end in stopping ground. The 120 east has been driven about 23 fathoms in a lode worth from 1 to 2½ tons of ore per fathom; present end rather disordered, but the driftage, the lode in places gets nipped up for a short distance, but I think the whole of the ground will pay to come away at (say) from 5s. to 5s. 8d. in 17, or be stoped for (say) 45s. to 50s. per fathom.

In the 60 a cross-out has been driven about 18 fms., at a point 11 fms. from starting a lode, has been intersected and driven west on its course 4 fms., through an ore lode; it is now being worked on tribute. At the end of the cross-cut the new lode has been intersected and driven west on its course 3 ft., on a lode 2 ft. wide, composed of quartz, red, and black oxide of copper. The value is from 1/4 to 1/8 per fm. The ore appears to be rich in quality, and it is impossible to tell its real value until a sample be assayed. I consider this an important discovery, the said lode being parallel with the caunter and other lodes that have yielded so much ore at and above this level. There is a long piece of ground standing both east and west of said cross-out, and backs nearly 80 fms. high standing entire. So we have every reason to expect to open up a rich piece of ground in this part of our property. Captain George tells me that when an opportunity presents itself the cross-out will be continued further south, in which direction there are three other known lodes; and, judging from the other parallel lodes that have proved so rich with the old company, and further, seeing the mineralised rock going from north to south in which the veins are embedded, I do not hesitate to say from present indications that there is every chance of meeting with some good discoveries in that direction. I shall not mention the ground you have at work, because the ground taken away is so little compared with the quantity of ground opened up, and the present management that is not worthy of note. Your reserves are steadily increasing, and if the tribute pitches—which I believe are about 50 at work—hold on in returns as now that your returns will regularly, and in a few months largely, increase. The pitwork at Kittow's has been removed, and the water brought back to the big engine, which keeps it with ease (say), four strokes per minute. This is a proof that the right thing has been done. We are now in the wet season of the year. They are busily engaged erecting the man-engine; this done it will be of great benefit to the men as well as to the company. In conclusion, I beg to say that one cannot be too well pleased with the work that has been accomplished in the time during the present management, and seeing the amount of reserves that have been thrown open to view I come to the conclusion that with a little better price for the ore South Caradon will soon show itself again to the front as a copper mine.—T. HODGE.

THE CHAIRMAN said that Capt. Hodge was entirely independent, and unconnected with the mine. The board had every confidence in Capt. George, but thought it would be satisfactory to the shareholders to have an independent report. (Hear, hear.) They had had to contend against the very low price of copper ore, which was a matter over which they could have no control. Since the mine was taken over the reduction in price had been considerable; last year they were getting 12s. 6d. to 13s. per unit, and last year, for 6 per cent. ore, they only got 9s. 2d. People who were capable of judging stated that such a state of things was not likely to last, and, therefore, he hoped there would be an improvement in the price of copper ore as well as in other minerals. Although the company took over the property at a price which was comparatively only a hammer value of the cost of plant and equipment, it is not anticipated that the price would be the only outlay, because the old company having given 12 months' notice to give up the site would not, of course, make any outlay upon the mine in the way of exploration development, but took away the ore to realise it before their term ended. In consequence of this the present company had executed large works of exploration, and the reports which had been read would show that no time had been lost in opening up the mine, and for taking away the ore which had been found. In levels and cross-outs they had driven 311 fathoms, which was a large piece of work to do in the time. At the meeting on the mine it was mentioned that the agent had reported that they could displace with one pumping-engine bringing the water back from the eastern shaft to Rule's shaft, which was the deepest point, and that the man-engine could be removed to Kittow's shaft. The labour of the miners in descending and ascending the shaft would be very much relieved, which meant a saving of expense. The calculation was that by those alterations the company would save something like 500l. per annum in cost. The change of pitwork at Rule's shaft and the necessary alterations had taken time and cost money, and, as Capt. Hodge would remark, was necessary and exceptional. The man engine was in course of erection at Kittow's, and he hoped that in two or three months it would be completed, and that expense saved. It was also found that the old company, naturally enough, had not kept up the diallings, and it was necessary to have the works accurately dialled and mapped. They employed the eminent firm of Henderson and Sons, of Truro, who dialled the whole of the works, and laid them down upon a plan, and he was pleased to say that the work was well and cheaply done. The practice of this company was to pay cash, and have no debt, and the shareholders would realise considerable advantage from that, as they would be able to buy in the cheapest market and obtain the best material. Since the last meeting the Stock Exchange had granted a quotation for shares. (Hear, hear.) As regarded the outlay, there was the payment of 16,000l. or 17,000l. for the mine, and including all expenses, about 20,000l. After all this large outlay he was pleased to tell them that the company had 6000l. upon deposit at bankers, 2000l. in cash and bills, and 12,500l. uncalled, representing about 20,000l. The agent led them to believe that now the exploration work had been carried out the returns could be largely increased, and if they got a better price for copper ore, which he hoped they would do, the directors would be able to show some very satisfactory results. (Hear, hear.) The discovery at the new lode at the 60 promised to be of considerable importance, and the ore was of a very valuable character. He hoped it would turn out all they desired. With regard to the accounts and the cost-sheets of the company, they were always open to inspection by any shareholder who desired to see them. He moved that the report of the agents be printed and circulated.

MR. MACRIS seconded the resolution. As the Chairman had stated, they had extended the driftage 311 fathoms, and in performing that work they had laid open actual stopping ground to the extent of 3000 fms., and only 103 fms. had been actually worked, so they would perceive the considerable reserves they had, independent of what might come out of the important discovery at the 60 fm. level, of ore yielding, according to the averages, from 10l. to 15l. per fathom. During the period the mine had been in possession of this company the expenses had been exceptionally large, chiefly owing to the old company having left the mine in considerable disorder. That disorder had to be repaired gradually; but the returns had in that time quite equalled the expectations of the directors, and they had taken out about 2000 tons of ore since the mine had been taken over. Had it not been for the low price of copper they would have done better. All the indications in the mine appeared to be of a most favourable character, and they had reason to believe the future of the mine was very encouraging indeed. The ends were looking extremely well in all the levels. They had in the Chairman a gentleman who brought to the discharge of his duties a rare combination of local knowledge, acquaintance with all the pertinent to one, and business capacity. The directors were thoroughly satisfied with the services of Capt. George.

MR. LANE asked Capt. George whether what he had recently seen of the mine fully bore out the high opinion he formed sometime ago as to its great value?

CAPT. GEORGE: I have no hesitation in saying that the ends have opened out better than I expected. I have never seen the ground more promising, or the ore more promising. The ground is favourable. The prices for driving have been remarkably good, being about 5s. to 7l. per fathom.

MR. LANE said they could not estimate what the improvement at the 60 fathom level would turn out to be. In the old working of the mine a parallel lode was intersected near the boundary, and driven back west, and turned out to be worth nearly 100l. per fathom; being in the same length of ground as that course of ore, he did not see why they should not see the present discovery hold east and west, and also hold for a considerable distance. It would add new life to the undertaking in that part of the mine. They had other parts too to develop, but he hoped they would confine their operations to that part for the present, and see some return before they made any further expenditure. The mine had more than met his expectations, and he had no hesitation in saying that, with a better price for copper, they might hope to get a good dividend from the concern.

MR. GEORGE BATTERS expressed his satisfaction with the financial position of the company. They had 20,000l. available cash for future working originally. It was expected that they would have to spend 12,000l., as the mine was so disordered, but actually their house was nearly put in order, and with a less cost. The economies mentioned in the agent's report, in connection with the pumping-engine, were beginning to tell. In two months the man-engine would be at work and the main surface works completed. They must face the present low price of copper, and must carry out such economies in the present state of trade as would enable some return to be made upon the capital invested in the concern. He thought the shareholders had great reason to be satisfied with the present position and prospects of the mine. (Hear, hear.)

THE CHAIRMAN mentioned that an application had been made to the railway company to lower the rate of carriage for the ore, and that matter had not yet been settled.

A question arose with regard to a call. THE CHAIRMAN said that the company did not require money, but probably a call would have to be made to meet the wishes of the Stock Exchange, as expressed at the time they granted the settlement.

On the motion of Mr. HOPPS, seconded by Mr. GIBBS, a vote of thanks was passed to the Chairman and directors, and the proceedings terminated, with a vote of thanks to Capt. George and the agent at the mine.

(For remainder of Meetings see this day's Journal.)

IRISH MINES.—SOUTH BEREHAVEN.—It is gratifying to learn that a box of ore from the South Berehaven Mine, County Cork, was sent last week to Messrs. Johnson and Sons, assayers to the Bank of England, Her Majesty's Mint, &c., samples of which were analysed by them, which yielded 43.20 per cent. of copper, and 8 ozs. 10 dwts. fine silver. Several tons of this splendid ore are already raised. A sample of gossan by the same assayer gave 1 dw. gold and 2 per cent. of copper per ton of 20 cwt.

PRACTICAL MINING—VALUATION OF COPPER ORE, AND PAYMENT OF TRIBUTERS.—No. V.

EXCHANGES.—The English value of any given amount of foreign money and *vice versa* at any given rate of exchange can readily be obtained by the use of the decimal fraction of 11. sterling. When the exchange is calculated at so many pence for the foreign coin in which accounts are kept, it is merely necessary to write down the amount in the foreign money and multiply by the decimal fraction of 11. representing the rate of exchange. The result will give the English value, the equivalent of the fractional parts being shown as a decimal. When the exchange is calculated at so much of the foreign money for the pound sterling the amount is written down in the foreign money and divided by the rate of exchange, fractional parts both in the amount and in the divisor being expressed in decimals, the mode of finding which will be explained presently. The quotient will be the value in English money, with a decimal for the fractional parts of any of a pound. If the method of determining the place of the point in the quotient in division by decimals be not already known, it can be learned by referring to the paragraph—“Decimal Calculations Generally”—given hereafter. There must be the same number of decimal places in the divisor and in the dividend, and the quotient will then be whole numbers; if more figures be added in the dividend so as to continue the division farther, the additional figures obtained for the quotient must be after the point. *Examples:* 1.—Find the value of 25976 dollars and 54 cents at 49d. per dollar. 2.—What is the English value of 1337 francs and 74 centimes when the exchange is 25.05 frs. to the pound?

25976.54	25.05	1337.74	53.402
206		8524	
		10090	
15585924		7000	
5195308		1990	

5351.16724

Consequently, the results are 5351l. 3s. 4d. and 53l. 8s. 0½d.; we call the quotient in the second example 53.402, because the last remainder is more than half the divisor. When we have to find what amount in the money of a foreign country will be equal to a given amount of English money we of course reverse the above operations. *Examples:* 1.—What is the value in French currency of 27l. 18s. 6½d., the exchange being 24.90 frs. to the pound? 2.—What is the value in Prussian currency of 54l. 14s. 7d. at 2s. 10½d. per thaler?

27.927	24.90	1122	30
		1079	13.20
2513430		640	12
111708			
55854			
		600	2.40
		20	
695.38230			

Therefore, 27l. 18s. 6½d. is worth at the rate of exchange mentioned 695 frs. 38 centimes; and in the same way we find that 54l. 14s. 7d. at the given rate of exchange is worth 377.44 thalers, or 377 thalers 13 silbergroschen and 2 pfennige.

GENERAL RATES OF EXCHANGE.—For rough general calculations, such as are necessary in reading foreign newspapers or business circulars, it will usually suffice to take the American dollar at 50d., or in large amounts \$5=11. Austria: 1 fl.=2s. Belgium: 25 frs.=11. China: Haikuan tael=77d.; Shanghai tael=70d. Denmark: 1 rigsdaler=26½d. France: 25 fr.=11. Greece: 25 drachmae=11. Holland: 1 fl.=20d. India: 1 rupee=2s. Italy: 25 lire=11. Portugal: 1 milreis=54d. Prussia: 1 mark=1s. Russia: 1 rouble=37d.

DECIMAL CALCULATIONS GENERALLY.—Neither addition nor subtraction of decimals can be performed unless the decimal points stand vertically under each other. With this exception no notice whatever is taken of the decimal points until the calculation is finished. When the numbers are written down in their proper position addition, subtraction, multiplication, and division are performed just as usual. In multiplication as many places must be pointed off in the product as there are decimal places in the multiplier and in the multiplicand combined. In division there must be the same number of decimal places in the dividend as in the divisor, and the quotient will be whole numbers; additional decimal places in the dividend will give decimal places in the quotient. By removing the decimal point one place to the right the quantity is multiplied by 10; two places 10 times 10 or 100 and so on. By removing the decimal point one place to the left the quantity is divided by 10; two places 10 times 10 or 100 and so on. *Examples:* a.—Add together 8.2, 312.21, 4.321, 16, 7.2, 5.04, and 783.1647. b.—Subtract 9.1674 from 617.42. c.—Multiply 7.34 by 2.4. d.—Divide 25.73 by 1.5.

a	c
8.2	7.34
312.21	2.4
4.321	
16	2936
7.2	1468
5.04	
783.1647	17.616
1136.1357	
b	d
614.42	1.50
9.1674	25.73
	1073
	230
	800
	500
	50
608.2526	

These examples will be so readily understood that explanations of them will be unnecessary.

CONVERSION OF DECIMALS.—It only now remains to explain the methods of finding the decimal representing any given fractional quantity, and of finding the fractional quantity (in usual expressions) which any given decimal fraction represents. Both these operations are extremely simple and can, if ordinary care be exercised, be very quickly performed. *Rules:* 1.—To find the value of a decimal in terms of the inferior denominations, multiply the decimal by the number of parts in the next lower denomination, and cut off as many places for a remainder, commencing from the right hand, as there are places in the given decimal, continue the operation for each lower denomination until the lowest is reached. 2.—To express fractional parts of a quantity as the decimal of a higher denomination, divide by the number of parts in the next higher denomination, continuing the operation to as many higher denominations as may be necessary. *Examples:* 1.—Express 0.7375 ton in hundredweights and quarters. 2.—Express 377.45 thalers in thalers, silbergroschen, and pfennige.

7375	377.45
20	30
14.7500	13.50
4	12
3.0000	6.00

The answers are therefore 14 cwt. 3 qrs., and 377 thr. 13 sgr. 6 pfen. respectively. In the first example we multiplied by 20 and by 4 because there are 20 cwt. in a ton and 4 quarters in a cwt. In the second example we multiplied by 30 and by 12 because there are 30 sgr. in a thaler and 12 pfennige in a sgr. The second rule is precisely the converse of the first, and will be at once understood from examples. *Examples:* 1.—Find the decimal of 11. corresponding to 17s. 9½d. 2.—Find the decimal of a yard corresponding to 1 ft. 6½ in.

4) 3	4) 1
12) 9.75	12) 6.25
20) 17.8125	3) 1.521
	0.800625
	0.307

The reason for using the several divisors will be known without explanation if the rule has been carefully studied. For further practice

prove that 25 silbergroschen is equal to 0.833 thaler; also that 13 lbs. is equal to 0.0048 ton.

CONCLUSION.—After the numerous explanations and examples that have been given, the reader should be able to avail himself of the advantage of calculation by decimals in every instance in which their use will abridge labour, whether it be in the case of questions similar to those which have already been treated of, or of other which may present themselves in connection with his ordinary business. For finding equivalents of given quantities in other denominations the use of decimals is frequently invaluable, and they are especially so in the conversion of English into metric measures of length, solidity, capacity, weight, &c., and *vice versa*. To facilitate these calculations we give a table of the multipliers to be used, assuming that this will be valuable to many. When the conversion is required to or from some weight, measure, or coin for which the multiplier is not already calculated such multiplier must be found (by the use of the method previously explained) by calculating how many units of the measure in which we require the results are contained in one unit of the measure to be converted; thus, if we require to know the number of avoirdupois pounds contained in a given number of kilogrammes the multiplier will be 2.2046, which is the number of pounds in a kilogramme. But if we want to know the number of kilogrammes in a given number of avoirdupois pounds the multiplier will be 0.4536, because that is the number of kilogrammes contained in one avoirdupois pound. The principle of calculation is the same for all conversions whatever.

MODERN PROGRESS IN MINE ENGINEERING.—No. II.

BY H. BRAMALL, M. INST. C.E.*

When a shot instead of doing its work spends its energy in blowing out the tamping (i.e., a blown out shot) it creates a violent sound wave which is believed to have caused explosions in collieries by forcing the flame of a Davy lamp through the gauze, and the fire and sparks from such a shot often extend to a long distance, while, even in the case of a shot which properly does its work, gas may be liberated and fired with the most disastrous results. To obviate or diminish this danger many ingenious methods have been proposed. Mr. McNab uses water in conjunction with powder or tonite in his cartridges, and in the lime system of which we have recently heard so much, holes are bored and charged with cartridges of compressed dry caustic lime, into which water is forced with somewhat uncertain results. Many varieties of wedges have at various times been brought forward, such as the hydraulic wedges of Bidder and Chubb, and Lever, and the combined screw and knee-lever wedge recently patented by Mr. W. F. Hall, and known as the Haswell mechanical coal-getter. Unfortunately, none of these have yet offered such advantages as to enable them to displace gunpowder, which continues to be used in mines where its use is attended with no very serious risk, and it is to be feared in many under conditions very hazardous.

The work of the miner engaged in carving out or holing and cutting a seam of coal is very arduous, and to diminish this toil, and lessen the cost and waste of coal involved, a variety of coal-cutting machines have been invented. The idea of employing mechanical power to accomplish this is not a new one, for a patent was taken out by Menzies in 1761 for working a pick mechanically. But increased attention has of late years been given to the subject. One of the earliest of the modern machines is Frith's, in which a pick is actuated by a small air-engine in much the style of the collier. The machines of Winstanley and Rigg and Meiklejohn have the cutters arranged on the periphery of a rotating disc, and saw out a groove after the manner of a circular saw. In Baird's the cutters are fixed upon a travelling pitch chain, while in the Lechner, an American machine, the cutters are mounted on a revolving bar driven by pitch chains. Coal cutting machines have not come into extensive use, for as hitherto constructed they necessitate a costly plant, are cumbersome to move above, are only effective in a tolerably long and straight face, such as cannot be maintained except with a pretty good roof and even quiet floor, and they offer but a slight diminution (if any) in the cost per ton. The advantage to be obtained from them is chiefly in a thin and hard seam in the increased percentage of large coal.

Fifty years ago few shafts in England exceeded 300 yards in depth, but with the great development which has taken place in recent years increased depth has been attained, and there are now at work a number of shafts over 500 yards, and a few reach depths from 640 (Pemberton) to 900 (Ashton Moss), the diameter having also been increased from 10 or 11 ft. to 16, 18, and even 20 ft. On the Continent are several shafts ranging from 833 yards (Sacré Madame) to 1224 (Adalbert, Przibram), the latter being the deepest in the world. The superiority of the circular form of shaft is becoming more fully recognised, and this form is now very generally adopted in stratified measures, and the economical necessity for better winding appliances is leading to an appreciation in the metalliferous districts of the advantages of downright or vertical shafts, and some form of guides over the older plan of having vacant inclined and zigzag shafts through which the kibble bungs and bounces in its erratic career to the surface.

Increased speed in shaft sinking has been gained by better organisation of labour: the Hindley Field shaft, 15 ft. diameter, was sunk by the ordinary appliances at a rate of 5.73 ft. per 24 hours, while at Houghton Colliery, near Barnsley, 9.21 ft. per 24 hours were sunk, the holes being drilled by hand and fired by electricity. Considerable success in America has attended a system of sinking, in which a series of holes were drilled by diamond drill to a certain depth, and having been filled with sand were blasted away in sections, and so saving the delay and loss of time caused by having to re-fix the drilling tackle after each blast.

Colliery shafts are now very generally lined throughout with brickwork, but at Saarbrück iron has been successfully applied to this purpose. Rings of T or channel section are fixed at intervals of about 39 in., and a lining of 2 in. oak planks placed behind these rings. In the most recent example a 12 ft. diameter shaft has been lined entirely with iron, rings of channel section being placed at intervals of 39 in., as before, but the intervening spaces are cased by 3-16 in. wrought-iron sheets. All these being carefully prepared on the surface it is claimed that a great saving in time is effected, and a reduction in cost of 30 to 40 per cent. How far this may possess the requisite element of durability is an unsettled point, but if backed by concrete there seems no reason why such a lining should not prove very effectual, especially in downcast and moderately dry shafts.

By far the greatest difficulty met with in shaft sinking is due to the presence of water either in the alluvial surface deposits or in water-bearing strata below. In some instances so formidable has been this difficulty as to be overcome only by the most stupendous efforts and at enormous expense, and often such efforts and such cost have resulted only in failure. The older methods of passing through these deposits were either by a system of sheet piling in successive tiers or by running drums of brick, wood, or iron, and these methods have done, and are capable of doing, good service where the quantity of water is not excessively large. Our neighbours in France, Belgium, and Germany have had to encounter great difficulties in this respect, and to them we owe several ingenious and successful methods of overcoming them. The Deutscher Kaiser pit was sunk through 244 ft. of alluvium and 176 ft. of cretaceous marls (without withdrawing the water from the shaft) by a rotating boring tool, fitted with leathern sacks for removing the materials, the cast-iron lining cylinders following the tool in its downward progress. The first of these cylinders, 17 ft. internal diameter, ran 192 ft., and this was followed by a second of 13 ft. 4 in. internal diameter, which ran a distance of 218 ft., and the whole work was completed in 20 months, of which 11 were spent in preparatory works, and 9 in actual boring.

The atmospheric system patented by Sir Thomas Cochrane in 1830, and adopted by Mr. Triger in 1845, is pretty well known from its frequent employment in sinking cylinders for bridge pier foundations in river beds. Recently it was applied at Bettisfield Colliery, North

* President's Annual Address to Liverpool Engineering Society.

Wales, in sinking a shaft through 103 ft. of alluvium on the banks of the River Dee, the outer cast-iron cylinder being 13 ft. diameter, and the inner one 6 ft. diameter with air lock—the cost being about 170l. per yard. Where the ground, while moderately firm, contains heavy feeders of water the Kind Chaudron system has proved very successful, numerous difficult sinkings in France and Belgium having been completed at a cost stated to be from 60l. to 120l. per yard, the deepest yet undertaken being one at Ghlin, near Mons, 1026 ft. deep and 14½ ft. diameter. In this method the boring is effected by a large trepan or boring bar carrying a series of steel cutters, the action being percussive, and some idea of the magnitude of the operations may be formed when it is known that the large trepan weighs 20 tons, while the cuiller or bucket for withdrawing the débris has a capacity of 12 tons. In England two shafts have been sunk at Marsden, near Sunderland, through magnesian limestone so charged with water (the shafts being within 400 yards of the sea) that the attempt to sink by the usual method had to be abandoned after the feeders pumped had reached 11,600 gallons per minute. By the Kind Chaudron system these two pits were bored through the water-bearing stratum to the depths of 217 and 266 ft. respectively, and the water effectually tubbed out, the pits when finished being 12 and 13 ft. diameter. The time occupied in completing No. 1 pit was 20½ months, and the cost averaged 236l. per yard, while No. 2 pit occupied 23 months, and cost 168l. per yard. Setting aside all questions of time and cost there is no other system at present known by which the work could have been accomplished at all. The same system has been applied to two 15 ft. shafts for the Cannock and Huntington Company.

For dealing with loose saturated alluvium Mr. Poetsch has originated the novel idea of freezing the mass to a solid, by boring a series of holes about 3 ft. apart lined with copper tubes inside, which are smaller tubes. A concentrated solution of the chlorides of magnesium and calcium, at a temperature of about 13° below zero, is then circulated through the tubes. After the ground is frozen solid the pit can be excavated in the centre of the mass in the ordinary manner, and tubbing put in, and this has been successfully carried out at the Grube Archibald, where 13 ft. of quicksand were encountered at a depth of 100 ft. below the surface.

Allusion has been made to the use of iron for lining and securing shafts, and the same material is coming into more extended use for securing and lining levels—our continental friends here also leading the way. Uprights and cross-trees of Γ , I, L section, and about 32 lbs. per yard have been used for main frames, the spaces being covered in by timber in the ordinary manner, though in some cases 4-in. square bars have been adopted for this purpose with good effect. In England old railway metals are sometimes used, and make excellent cross-trees or bars. The general conclusion arrived at by the continental engineers is that the first cost is about double that of wood, but the cost of subsequent maintenance is two-thirds less. The necessity of keeping back water in a level often arises, and has been met by inserting a dam, formerly a plain straight brick and cement wall of great thickness, improved by giving it a form segmental in plan, but more recently a spherical form has been adopted, which would seem to be theoretically perfect.

SYSTEMATIC AND DESCRIPTIVE MINERALOGY.—For practical utility few mineralogical works are more worthy of commendation than those of Mr. J. H. Collins, of the Rio Tinto Mines, Huelva (whose name, however, is better known to the readers of the *Mining Journal*, from his long connection with the Miners' Association of Cornwall and Devon), and the new volume just issued in Collins' advanced series—*Mineralogy*: By J. H. COLLINS, F.G.S., Vol. II. *Systematic and Descriptive Mineralogy*. London and Glasgow: William Collins, Sons, and Co.—although necessarily a compilation is arranged with such care and judgment that reference to the facts recorded are facilitated to the utmost. An admirable system of classification is adopted, which whilst not differing widely from several previous arrangements may be described as an industrial system, the grouping being to some extent according to the application of the mineral, thus combining the systems of Dana and Weiss, so that there are the seven primary classes—native elements, including combinations of similar elements with each other; pyritoids or combinations of metals with semi-metals and metalloids; haloids, oxides, spathoids, silicates, and hydrocarbons. The minerals in each class are then grouped around certain well-known species, the subdivision being chiefly chemical, although the physical properties are carefully considered. Mr. Collins seems to have aimed at combining the practical utility of Weiss with the strictly systematic method of Dana, and has been very successful in doing so. With regard to Dana's method Mr. Collins mentions that very curious results are often arrived at when attempts are made to classify minerals on rigid principles, and that Dana in his *System of Mineralogy* places water in the division of anhydrous oxides, and the dilute solutions of sulphuric acid met with in nature with the anhydrous sulphates. Mr. Collins' volume is well illustrated with about 400 woodcuts, and appears well suited to the requirements of those for whom it is written—practical working miners, quarrymen, and field geologists.

THE INSTITUTION OF CIVIL ENGINEERS.—At the meeting of this society on Tuesday (Sir J. W. Bazalgette, C.B., President, in the chair) it was announced that the Council had recently transferred Edward Golding Barton, Mark William Carr, jun., George Edward Moore, James Stuart Swallow, and William Thomson, to the class of Members; and had admitted Léon Harry Barker, Hugh Walter Belcher, Arthur Coleman, Alfred Howe Collinson, John Rowland Crook, Frederick William Cross, John Richard Davison, Frederic James Edge, Andrew Forbes, George Leopold Gregson, Arthur Harnett George Hilder Libbis, Thomas Lodwick Miller, Fred. Platt, Hans Wessel Poppe, Peter Augustus Ransom, B.A., Frank Walter Scott, jun., George Thomas Sibbings, John Bunting Simpson, and Charles Gordon Stuart, as Students. At the monthly ballot the Right Hon. Lord Bramwell, F.R.S., and the Hon. Sir William Robert Grove, F.R.S., were elected Honorary Members; Ralph Peacock, Manchester; William Willcox, Government Railway, C.G.H.; John Edward Wolfe, Alagoas Railway, Brazil; Thomas William Worsdell, G.E. Railway, Stratford; James Walker Wright, Superintending Engineer, P.W.D., India; and William Wright, Spalding, Members; Arthur Robert Beynon, Stud. Inst. C.E., G.W.R., Paddington; James Johnstone Bourne, Stud. Inst. C.E., Wallington; Charles Ernest Bruges, Stud. Inst. C.E., Westminster; Robert Cope Hardy Davison, Stud. Inst. C.E., Westminster; John Dewrance, Stud. Inst. C.E., Great Dover Street; Leonard Gill, Stud. Inst. C.E., Westminster; Charles Fleming Hargreaves, Rio de Janeiro; Charles Hilton Hingston, jun., Stud. Inst. C.E., Brighton; William Tindal Jennings, Canadian Pacific Railway; Charles Arthur Lovegrove, Stud. Inst. C.E., East Dulwich; George Croydon Marks, Stud. Inst. C.E., Dublin; Robert John Preston, Westminster; John Henry Riley, Sao Paulo Railway, Brazil; Herbert Francis Waring, Stud. Inst. C.E., Cardiff; William Pettit Ward, Stud. Inst. C.E., Newcastle-upon-Tyne; and Lars Severin Zachariassen, Charing Cross, Associate Members; and James Andrews, Allegheny, Pa., U.S.A.; and Lieut. John Burn-Murdoch, R.E., P.W.D., India, Associates.

SINGARENI COAL FIELD.—An interesting lecture—delivered at the Government Museum, Madras, by Mr. William King, B.A., D.Sc., Deputy Superintendent of the Geological Survey of India, on the Singareni Coal Field and others adjacent to or in the Madras Presidency—has been printed in pamphlet form (Madras: Higginbotham and Co.), with the sketch map used to illustrate the subject. An abstract of the pamphlet will be published in a future *Mining Journal*.

HOLLOWAY'S OINTMENT AND PILLS—SURE RELIEF.—The weak and enervated suffer severely from nervous affections when storms or electric disturbances agitate the atmosphere. Neuritis, gouty pang, and flying pains, very distressing to a delicate system, may be readily removed by rubbing this ointment upon the affected part after it has been fomented with warm water. The pills, taken occasionally in the doses prescribed by the instructions, keep the digestion in order, excite a free-flow of healthy bile, and replenish the impoverished blood with those richer constituents which result from thoroughly assimilated food—in the absence of which the strongest must inevitably sink into feebleness, and the delicate find it difficult to maintain existence. Holloway's ointment and pills are infallible remedies.

THE CAUSE OF COLLIERY EXPLOSIONS.

An interesting paper recording some practical experiments upon iron and steel, by Mr. J. M. ALLEN, is published in the Locomotive, the organ of the Hartford U.S. Steam Boiler Inspection and Insurance Company—London: Trübner and Co., Ludgate-hill—in which he remarks that when we wish to break a bar of iron we usually cut a channel with a cold chisel around the entire bar at the point where the break is desired. This having been done we place the bar on an anvil with the channel slightly over its edge. A smart blow on the out-lying portion will cause a fracture which at first sight has all the appearance of crystallisation. Now if we take this same bar and cut a channel on one side and subject it to the same treatment with the channelled face up, the crystalline appearance will show slightly in close proximity to the bottom of the channel, but the main body of the bar will be bent and partially broken, displaying a fibre with a long silky appearance. Now if we take this bar with no previous preparation, and subject it to the same treatment, we shall find that instead of breaking, it will simply bend to a right angle or more, showing no fracture whatever.

The question arises why with the same blow do these different specimens of iron show such widely different results? It has been said that the blow on the cold chisel disturbed the fibre of the iron, weakening it, and putting it in condition to fracture at the point cut. Being desirous of demonstrating this matter, and for reasons given below, we obtained a bar of iron 1½ in. wide and ¾ in. thick. Instead of using a cold chisel we made use of a file, and cut a channel around the entire bar. We then placed the bar on an anvil with the channel slightly over the edge, struck the outlying portion a smart blow, and it flew from the bar like cast-iron. The fracture presented a crystalline appearance. This experiment satisfied us that something other than the disturbance of the fibre by the cold chisel was the cause of this sudden disruption, and consequent crystalline appearance.

Some have argued that when the original skin of the iron was broken or cut the strength was greatly reduced, and that fracture in bending was well nigh certain. To settle this theory we cut again a channel around the bar, and put it upon a planer, and planed away the surface for some distance each side of the channel, until the channel was entirely planed out. The bar was reduced in thickness nearly one-third, but the original skin of the iron was gone. We next subjected this to the same treatment as described above, and it bent beautifully with no indication of fracture. This demonstrated to our satisfaction that the original skin of the iron was not in this kind of strain what saved iron from fracture. (It should be stated here that iron of good quality has been broken with an apparently crystalline fracture, where no channeling or previous preparation had been made. See Kirkaldy's Experiments on Wrought-iron and Steel. But the circumstances were different from those under discussion here.) When we bend a bar of iron slowly the fibres on the convex or outer surface of the bend are disturbed very greatly comparatively, and this distention or elongation of fibre decreases as approach is made to the other side of the bar, where a crumpling of the surface fibre will take place. From a careful examination of the bent portion the different layers of fibres, so to speak, appear to have slipped or slid one over the other to an extent depending upon the degree of strain brought to bear upon each. Sections cut from the bent portion when examined with a microscope show more or less distinctly that the laminae and iron threads have become disturbed and loosened in their cinder envelopes, particularly on the outer side of the bend. If the bending is repeated back and forth several times the loosening up of fibre is distinctly seen without the aid of a glass.

Having briefly considered the action of iron fibre in the process of bending we return to the question of fracture. Why does the bar break suddenly and with a crystalline appearance under a smart blow at the point marked or channelled with a file? When a bar of iron is bent the outer fibres receive the strain first, breaking its severity as it is transmitted to those underlying. The disturbing force is distributed over the entire portion of the elongated fibre, diminishing each way from the point of greatest strain. Now it will be seen that by cutting a channel through the outer layer of fibre

the strain is confined to the point where the channel is cut. The fibre on either side to the depth of the channel is not acted upon at all, and exerts no influence as a protection to the underlying layers of fibres, hence, when the blow is received the effect is confined to the channel, the fibre having little or no opportunity to protect itself, and it breaks short off. When a channel was cut in the bar on both sides, and then planed out, the bar was virtually restored to its normal condition, and its behaviour was the same as when in its original condition. Had we space allusion might be made to inferior qualities of iron, where in piling the centre portions are very poor indeed, while the outside bars are of unexceptionably good quality. This kind of iron presents a good surface, but in bending and breaking its inferior quality is readily discovered. But the experiments which we made were with good bar iron. Now the object of these experiments was this. We not unfrequently find boilers fractured along the edge of the outer lap of the sheet, both transverse and longitudinal, and we further find a great many boilers where the caulking tools have been most carelessly used. It often occurs that the corner of the tool is allowed to cut a channel entirely through the skin of the iron which renders the plates weak at the point often of greatest strain. The immense force in a boiler under pressure is little understood by those not familiar with the laws of steam, and when we take into consideration the fact that this immense pressure is striving to force the surrounding iron into a truly cylindrical form we shall gain some idea of the great strain brought to bear along the lap of the joints—the points deviating farthest from a true cylinder—and the importance of having the iron of the best quality, and free from all defects by the careless use of caulking tools or otherwise. The fractures found at joints, both longitudinal and transverse, are brought about by expansion and contraction, or by fretting of the iron from uneasy seating of the boiler in its setting, and it will be readily seen that any defect in the iron, at or near the point of greatest strain, is very liable to result in fracture. Boilers are sometimes met with that are at least of one-third less capacity than they should be for the work required. The engine requires more steam than they can easily and steadily carry, hence at every revolution the draft is so great that the hand of the pressure gauge will vibrate through an arc measuring a variation of from 10 to 15 lbs. The boiler feels the accumulating pressure resulting from fires fiercely urged, and expands to its utmost to accommodate it until the opening ports conduct the steam to the cylinder and afford it momentary relief. Thus, the boiler like a great animal breathes, and its respirations can sometimes be detected by the eye. With this slow but continuous process of bending back and forth, is it any mystery that boilers finally give out? And if instead of good sound iron there are defects at the points of greatest strain need we look for mysterious agencies when boilers rupture, burst, or explode?

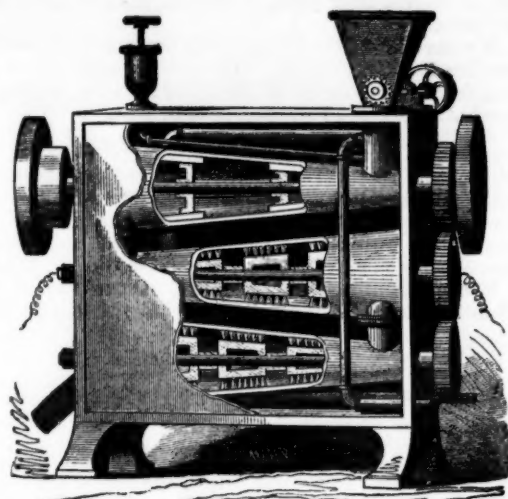
C. H. MAY AND CO.'S PRESS MANUAL.—The seventh annual edition of this manual—that for 1884—has just been issued, and appears to have been very carefully corrected to date. That "judicious advertising is the keystone of commercial success" is now so generally recognised that such manuals as this have become indispensable to almost everyone. The publishers—Messrs. C. H. May and Co., General Advertising Offices, Gracechurch-street—are amongst the oldest advertising agents in the City, and, therefore, possess great facilities, of which they have not failed to avail themselves for collecting the necessary facts. The Manual gives a complete list of newspapers, magazines, reviews, periodicals, &c., published in the United Kingdom, and supplies precisely such information as is essential to the intending advertiser.

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This machine or amalgamator is adapted for free-milling gold or silver ores, or refractory after roasting. It consists of a series of three or more large cylinders, which at one end are placed one above the other in a horizontal position, a shaft or spindle running through the centre of each. The ore and mercury are fed into the first cylinder, passing into the second, and then to the third. The first cylinder is furnished with steel rollers which nearly touch the sides of the cylinder, and revolve at a good rate of speed, mixing the mercury and ore. The second cylinder is furnished with large steel brushes attached to the shaft or spindle, revolving at a high rate of speed; through this a current of electricity is furnished by a Westinghouse dynamo electric machine, which materially assists in gathering the particles of very fine gold together, and thoroughly amalgamating the metal and mercury. The third cylinder is similarly furnished to the second; into this the amalgam passes, and is again acted upon and mixed by the brushes to catch any gold which might have escaped amalgamation in the second. A fourth cylinder may be used if found necessary.

The amalgamated pulp then passes through a revolving copper drum, plated with quicksilver inside. As the drum revolves it takes up the most part of the amalgamated gold. As the inside of the drum is constantly washed with a spray of water from perforated pipes fixed inside of said drum, a clean-plated surface is constantly brought in contact with the pulp or tailings as it passes out from the cylinders. After leaving the drum it falls down on to incline copper plates, the same as is now used in stamp mills.

The amalgam can be collected from the drum and plates without stopping the machine, and any live quicksilver that passes will be caught in syphons. The tailings are carried off with the water. The machine when attached to the flume will be driven by the waste water; it sifts the fine sands from the coarse gravel, and amalgamates it as above.

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4.—The small cost per ton at which the ore can be treated.
5.—By the addition of the powerful current of electricity that passes off the revolving brushes, the most minute particles of gold will be caught and retained, which in the ordinary flume and stamps passes off with the water; this often amounts to a large percentage.

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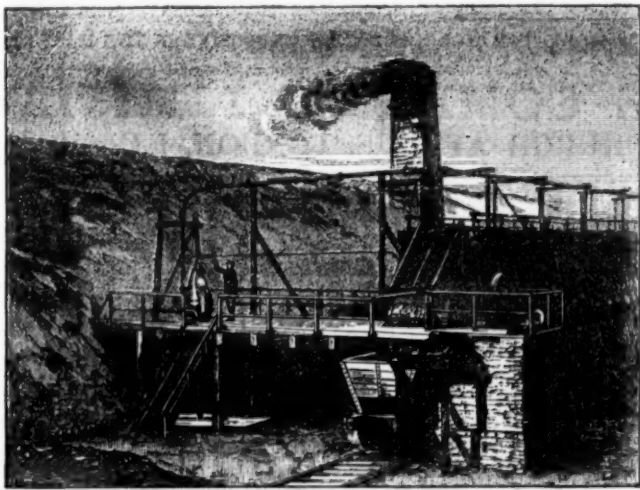
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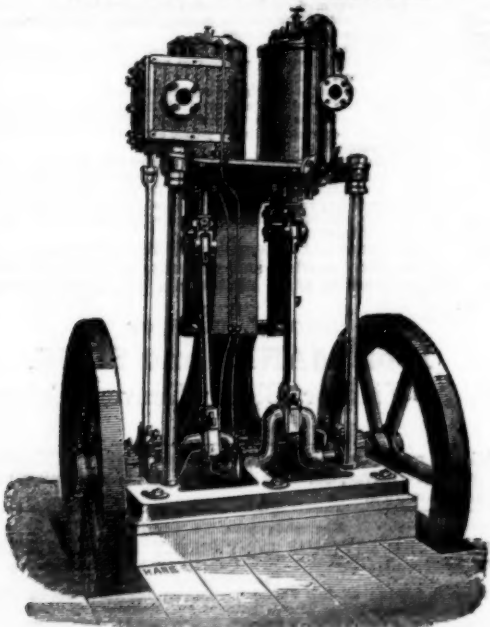
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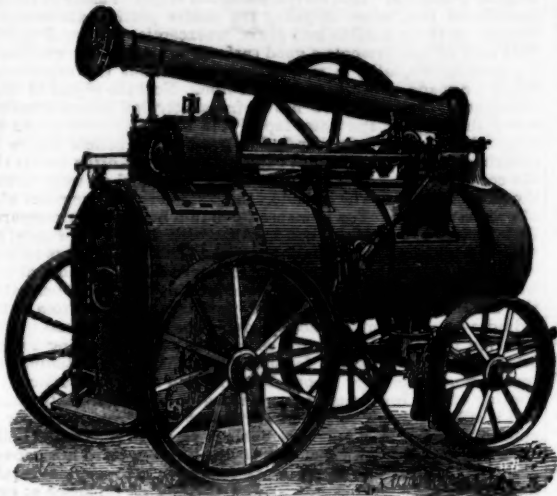
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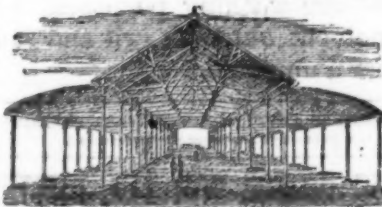
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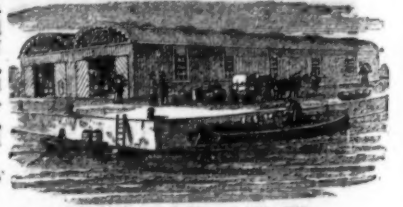
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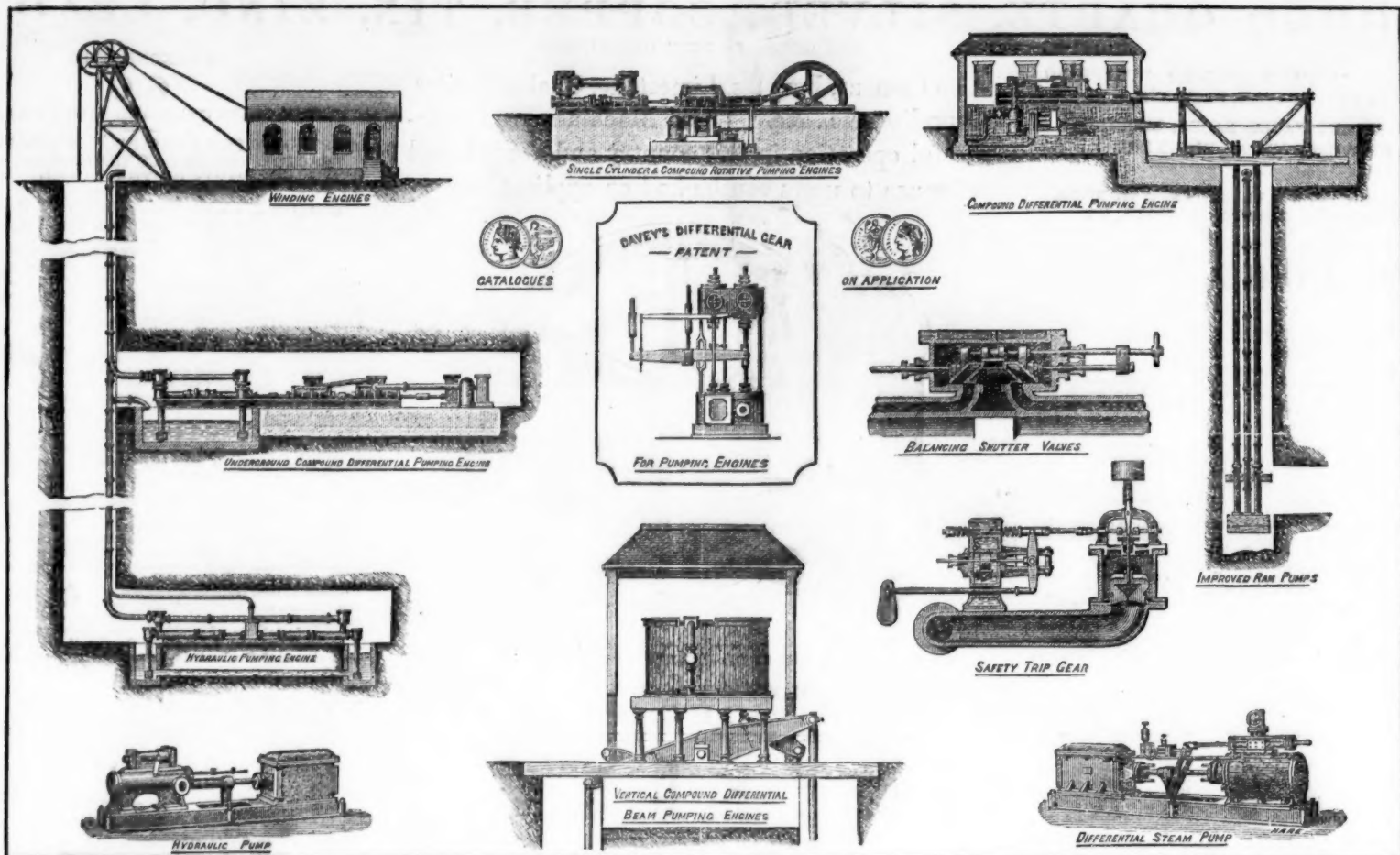
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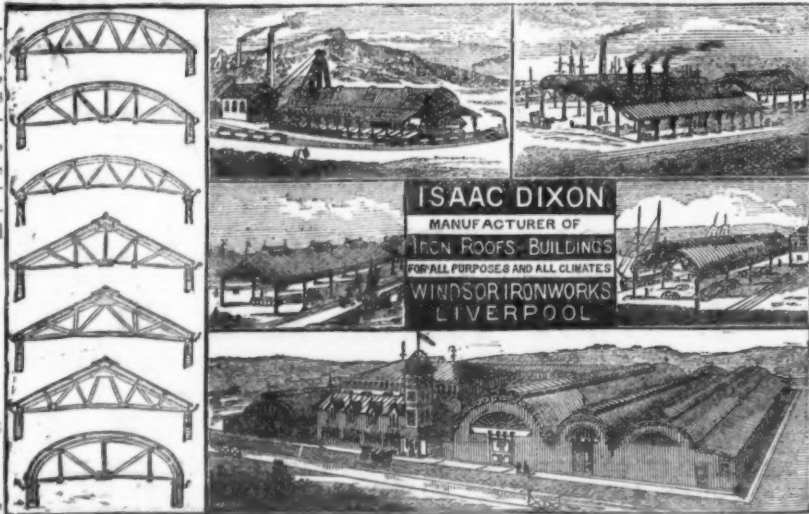
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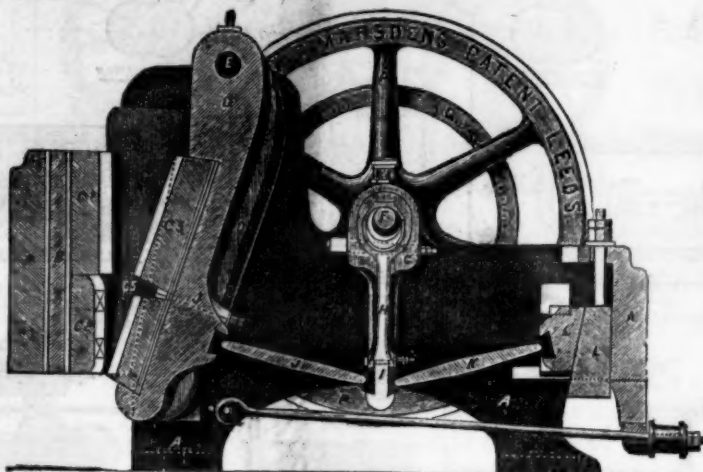
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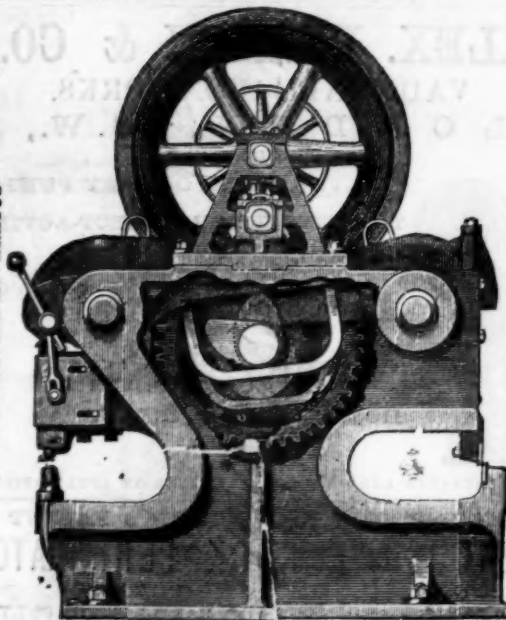
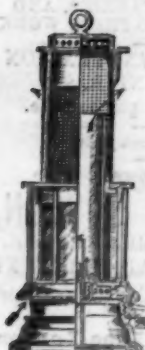
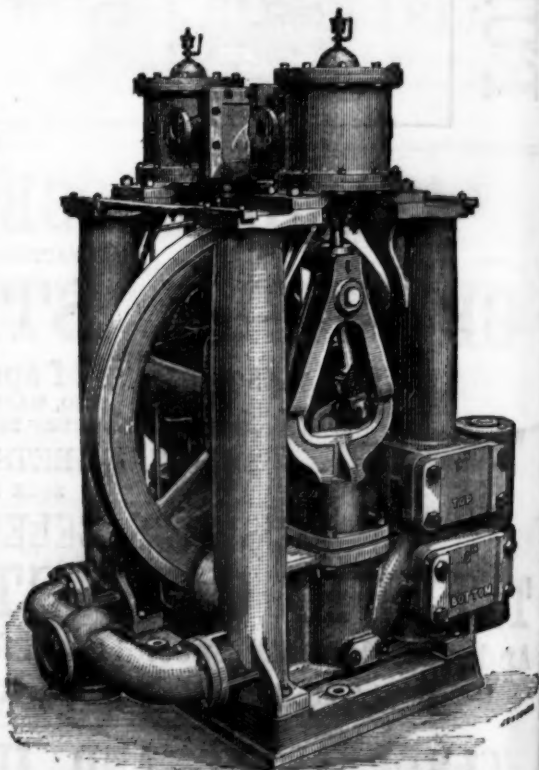
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